SUBJECT INDEX.

[References to the papers read before the Institute are indicated by the word *Paper* following the page number. The letter *P.* denotes a reference in Section I. of the Journal, which contains the reports of the proceedings of meetings, the papers read, and the discussions thereon. The letter *A.* denotes a reference to the section dealing with abstracts.]

Indexing of Alloy Steels and Other Alloys. In the indexing of alloy steels, carbon and iron are ignored and the alloying elements contained in the steel are arranged in alphabetical order; for example, all references to nickel-chromium-molybdenum steel will be found under the heading chromium-molybdenum-nickel steel. In the indexing of other alloys, carbon and iron, when present, are included in the title; iron, when present, is always mentioned first, and the other elements follow in alphabetical order, carbon being in all cases mentioned last. Examples: "iron-silicon-carbon alloys" and "iron-chromium-nickel-carbon alloys."

ACETYLENE, use for cutting steel, 245*A*.
ACETYLENE-AIR MIXTURES, dilution to prevent explosion, 197*A*.
ACETYLENE-OXYGEN MIXTURES, explosion, pressure occurring, 197*A*.
ACID RESISTANCE, iron-chromium alloys, 101*A*.
ACID-RESISTANT STEEL, manufacture, 135*A*.
ADAMSON, DANIEL, & CO., LTD., plant, 291*A*.
AGE-HARDENING:
  metals, 41*A*.
  metals, bibliography, 41*A*.
AGEING:
  iron and steel, 41*A*.
  iron and steel, bibliography, 42*A*.
  plastically-deformed steel, 98*A*.
  quench-, steel, 238*A*.
  strain-, steel, 238*A*.
AIR:
  circulation in furnaces, 190*A*.
  oxygen-enriched, use with blast-furnace gas in open-hearth furnaces, 278*A*.
AIR-FURNACE, for manufacture of cast iron, 77*A*.
AIRCRAFT CONSTRUCTION, use of stainless steel, 257*A*.
AJAX-HULTGREN HEAT-TREATMENT FURNACE, 145*A*.
ALABAMA, blast-furnace practice, 6*A*.
ALKALIS:
  action on refractory materials, 119*A*., 121*A*.
  corrosion of steel, 107*A*.
"ALLOY 548," 94*A*.
ALLOYS:
  Alnic, manufacture and properties, 98*A*.
  Alnico, manufacture and properties, 98*A*.
  aluminium-copper, hardness-temperature curves, 140*P*.
  aluminium-copper, specific-heat/temperature curves, 140*P*.
  chromium-cobalt-tungsten, use for valve seats, 198*A*.
  copper, corrosion in phosphoric acid, 57*A*.
  copper-gold, resistance-temperature curves, 131*P*.
  copper-gold, specific-heat/temperature curve, 123*P*.
  copper-silver, hardness-temperature curves, 139*P*.
  copper-silver, specific-heat/temperature curves, 139*P*.
  development, 100*A*.
  elasticity modulus, 295*A*.
  Hyperm, magnetic properties, 206*A*.
  iron, equilibrium diagrams, effect of alloying elements, 105*A*.
  iron-carbon, transformations, austenite, 51*A*.
  iron-chromium, acid-resistance, 101*A*.
  iron-chromium, determination of nitrogen, 312*A*.
  iron-chromium-manganese, properties, 256*A*., 257*A*.
  iron-chromium-nickel, detection of ferrite by magnetic means, 207*A*.

ALLOYS (*contd.*)—
iron-copper, magnetic alloys, 99*A*.
iron-copper-nickel, recrystallisation, 103*A*.
iron-molybdenum, precipitation hardening, 41*A*.
iron-nickel, magnetic properties, 99*A*.
iron-nickel, magnetic properties, effect of grain size, grain orientation and alloying elements, 42*A*.
iron-nickel, magnetic properties, effect of heat treatment, 300*A*.
iron-nickel, recrystallisation, 307*A*.
iron-nickel, specific heat, 300*A*.
iron-silicon, corrosion in phosphoric acid, 57*A*.
iron-silicon, polishing, electrolytic, 260*A*.
iron-silicon, solubility of nitrogen, 99*A*.
iron-tungsten, precipitation hardening, 41*A*.
magnesium, machinability, 202*A*.
nickel, corrosion in phosphoric acid, 57*A*.
nickel, use in gas industry, 161*A*.
nickel, use in mining industry, 161*A*.
preparation by fusion, 128*A*.
specific heat/temperature curves, 122*P*.
structure, 63 *Paper*; 306*A*.
ALNIC, manufacture and properties, 98*A*.
ALNICO, manufacture and properties, 98*A*.
ALUMINA :
effect on blast-furnace slags, viscosity, 127*A*.
reactions with iron sulphides, 228*A*.
reduction, 73*A*.
ALUMINA REFRACTORIES. *See* Refractory Materials.
ALUMINIUM :
determination in iron and steel, 313*A*.
determination of manganese and magnesium, 313*A*.
effect in ingots, blowholes, 81*A*.
effect in steel, cutting properties, 201*A*.
effect in steel, grain growth, 104*A*.
sclero-grating tests, 367*P*.
use for deoxidation of steel, 136*A*.
ALUMINIUM-CHROMIUM CAST IRON, Cralfer, 276*A*.
ALUMINIUM-CHROMIUM STEEL :
corrosion, 58*A*.
sclero-grating tests, 379*P*.
ALUMINIUM-CHROMIUM SYSTEM, 81*P*.
ALUMINIUM COATINGS :
for firebricks, 66*A*.
on wire, 33*A*.
porosity, 156*A*.
ALUMINIUM-COBALT SYSTEM, 86*P*.
ALUMINIUM-COPPER ALLOYS :
hardness-temperature curves, 140*P*.
specific-heat/temperature curves, 140*P*.
ALUMINIUM-COPPER-NICKEL SYSTEM, 105*P*.
ALUMINIUM-COPPER SYSTEM, 88*P*.
ALUMINIUM-NICKEL STEEL, corrosion in nitrates, 57*A*.
ALUMINIUM-NICKEL SYSTEM, 86*P*.
AMERICA :
iron ore composition, 412*P*.
iron ore reserves, 410*P*.
manufacture of pig iron, 405 *Paper*.
AMERICAN COAL, coking properties, 4*A*., 68*A*., 174*A*.
AMERICAN ROLLING MILL CO., rolling-mill plant, 141*A*.
AMERICAN STEEL AND WIRE CO., austempering practice, 196*A*.
AMMONIUM NITRATE, corrosion of steel, 57*A*.
ANALYSIS, 109*A*., 214*A*., 311*A*.
micro-, gas, 111*A*.
polarographic, 111*A*., 214*A*.
polarometric titration, 215*A*.
spectrum, 313*A*.
spectrum, cast iron, 109*A*.
spectrum, determination of niobium and tantalum in steel, 110*A*.
spectrum, ores, 111*A*.
use of perchloric acid, 109*A*.
ANDRÉ DUMONT COLLIERY, coal-cleaning plant, 68*A*.
ANNEALING :
bright, 146*A*.
bright, chromium-nickel steel, 242*A*.
bright, strip, 22*A*.
chromium steel, effect of original structure, 192*A*.
killed steel, 23*A*.
malleable cast iron, rôle of graphitisation nodules, 262*A*.
rimming steel, 23*A*.
silicon-steel sheets, 242*A*.
strain-, 192*A*.
strip, for production of granular pearlite, 91*A*.
tool steel, 146*A*.

ANNEALING (*contd.*)—
transformer steel, decarburisation in hydrogen, 144*A*.
ANNEALING FURNACES, 242*A*.
bright, 22*A*., 145*A*., 146*A*., 186*A*.
Grunewald, 145*A*., 242*A*.
for malleable cast-iron, 9*A*.
refractory materials, 222*A*.
for wire, 289*A*.
ANNUAL MEETING, proceedings, 1*P*.
ANTI-PIPING COMPOUNDS :
composition, 265*P*., 281*P*.
effect on ingots, segregation, 263 *Paper*.
ANTIMONY, effect in steel, welding, 294*A*.
" ARDOLOY," 94*A*.
ARGON, effect in steel, welding, 294*A*.
ARMCO IRON :
damping capacity, 181*P*.
polishing, electrolytic, 260*A*.
ARSENIC, effect in steel, welding, 294*A*.
ASBESTOS CEMENT, coating for tubes, 35*A*.
ASSOCIATES, election, 3*P*.
ASTON-BYERS PROCESS, 127*A*.
ATLANTIC STEEL CO., soaking pits, 85*A*.
ATMOSPHERES :
controlled, for heat-treatment furnaces, 193*A*., 242*A*.
protective, 146*A*.
protective, regenerators for, 146*A*.
AUSTEMPERING :
applications, 24*A*.
mechanism, 195*A*.
small parts, 196*A*.
AUSTENITE :
decomposition products, effect on steel, 48*A*.
transformation, 50*A*., 51*A*.
AUSTENITIC STEEL :
detection of ferrite by magnetic means, 207*A*.
nitriding, 90*A*.
tensile properties, effect of work-hardening capacity, 296*A*.
tensile tests, time factor, 158*A*.
AUSTRALIA, iron ore deposits, 63*A*.
AUTOMOBILE-ENGINE CYLINDERS, wear, 206*A*.
AUTOMOBILE ENGINES, production, 231*A*.
AUTOMOBILE FRAMES, welded, design, 93*A*.
AUTOMOBILE PARTS, flame-hardening, 19*A*.
AUTOMOBILE SHEETS, spot welding, 149*A*.
AXLE STEEL, grain-size determination, 263*A*.
AXLES :
fatigue cracks, 96*A*.
hardening, 194*A*.

BABCOCK & WILCOX CO., welding of boilers, 150*A*.
BALL-BEARING STEEL, annealing, effect of original structure, 192*A*.
BAR MILLS, 17*A*., 18*A*.
BARCRO WIRE-DRAWING MACHINE, 187*A*.
BARIUM CARBONATE :
reactions with iron sulphide, 228*A*.
use in case-hardening, 241*A*.
BARIUM OXIDE, reactions with iron sulphide, 228*A*.
BARS, heat treatment, 23*A*.
BARVOYS COAL-CLEANING PLANT, 68*A*.
BARYTE PROCESS for determination of carbon, 109*A*.
BASIC BESSEMER CONVERTERS :
effect of nitrogen in steel on age of lining, 11*A*.
use of oxygen-enriched blast, 79*A*.
BASIC BESSEMER PROCESS, reactions, 182*A*.
BASIC BESSEMER SLAGS, recovery of vanadium, 82*A*.
BASIC OPEN-HEARTH PRACTICE, 79*A*., 233*A*.
BASIC OPEN-HEARTH PROCESS :
duration of boil, 80*A*.
sulphur control, 135*A*.
BASIC OPEN-HEARTH SLAGS, iron oxide concentration, 279*A*.
BAUM-HEUSER, swelling test, 174*A*.
BEARINGS :
lignostone, 141*A*.
permissible loads, 240*A*.
synthetic resin, 87*A*., 140*A*., 188*A*.
BECKER COKE OVEN, 4*A*., 223*A*.
BELGIUM, corrosion research, 53*A*.
BEND FATIGUE TESTS, 252*A*.
BEND TENSILE TESTS, 203*A*.
BEND TESTING MACHINE for small specimens, 103*A*.
BEND TESTS, weld metal, 244*A*.
BENDING MOMENT, constant, effect of cracks on calculated nominal stress of specimen subjected to, 250*A*.
BENEDICKS AND LÖFQUIST THEORY, of grain growth, 48*A*.
BENZOL :
determination in wash oils, 314*A*.
distillation towers, design, 69*A*.

BESSEMER CONVERTERS :
basic, effect of nitrogen in steel on age of lining, 11*A*.
basic, use of oxygen-enriched blast, 79*A*.
blowing at constant pressure, 133*A*.
BESSEMER GOLD MEDAL, awarded to A. McCance, 5*P*.
BESSEMER PROCESS, basic, reactions, 182*A*.
BESSEMER SLAGS, basic, recovery of vanadium, 82*A*.
BIBLIOGRAPHY, 114*A*., 218*A*., 318*A*.
age-hardening, metals, 41*A*.
ageing of iron and steel, 42*A*.
grain size in steel, 48*A*.
welding of copper steel, 26*A*.
welding of tungsten steel, 199*A*.
BILLETS :
reheating furnaces, 186*A*.
surface defects, 185*A*.
BLAST :
dry-air, 126*A*.
measurement at blast-furnaces, 178*A*.
oxygen-enriched, use in basic converters, 79*A*.
BLAST-FURNACE GAS :
cleaning, 437*A*.
use in steel industry, 125*A*.
use with oxygen-enriched air in open-hearth furnaces, 278*A*.
washing, 176*A*.
BLAST-FURNACE PLANTS :
American, costs of transporting raw materials, 426*P*.
American, handling of raw materials, 429*P*.
Inland Steel Co., 274*A*.
Mexico, 406*P*.
Nova Scotia, 406*P*.
Republic Steel Corporation, 227*A*.
Staveley Coal and Iron Co., Ltd., 126*A*.
Tata Iron and Steel Co., 455*P*.
Richard Thomas & Co., Ltd., 6*A*.
Workington Iron and Steel Co., Ltd., 6*A*.
BLAST-FURNACE PRACTICE :
Alabama, 6*A*.
Carnegie-Illinois Steel Corp., 7*A*.
effect of coke properties, 227*A*.
effect of slag on quality of iron, 7*A*.
Kuznetsky Works, 70*A*.
Russian, 70*A*., 126*A*.
Swedish, 6*A*.
United States, 405 *Paper*.
Zaporozhstal Works, 70*A*., 126*A*., 227*A*.
BLAST-FURNACE PROCESS, 71*A* :
control by measurement of flue dust produced, 179*A*.
solution-loss reactions, 7*A*.
BLAST-FURNACE SLAG :
acid, use, 7*A*.
foamed, British specification for concrete aggregate, 72*A*.
hydraulic properties, 72*A*.
viscosity, effect of elements, 127*A*.
BLAST-FURNACE STOVES :
Gjers, 6*A*.
Lindblom, 6*A*.
Tholander, 6*A*.
BLAST-FURNACES :
" bear " formation, 222*A*.
behaviour of titaniferous ore, 71*A*.
blast, dry-air, 126*A*.
blast measurement, 178*A*.
capacities, American, 429*P*.
charging, 432*P*.
charging bells, 177*A*.
dimensions, American, 428*P*., 441*P*
dimensions, British and Continental, 450*P*.
dimensions, Indian, 456*P*.
electric, 6*A*.
gas composition, 274*A*.
gas flow, 291*P*.
hearths, standard depth, 70*A*.
linings, wear, 222*A*.
oxidising zone, effect of nature of coke, 70*A*.
refractory materials, 222*A*.
repair, 70*A*.
smelting of low-grade ore, 71*A*.
tuyere design, 178*A*.
BLAW-KNOX VALVES, 134*A*.
BLOOMING MILLS. *See* Cogging Mills.
BLOWHOLES, in ingots, effect of aluminium additions, 81*A*.
BLOWING ENGINES, used at Duddon furnace, 8*A*.
B.N.F. JET TEST, for determining thickness of coatings, 30*A*.
BOEING AIRCRAFT CO., production of copper-silicon steel castings, 9*A*.
BOILER PLANT, Richard Thomas & Co., Ltd., 124*A*.
BOILER PLATES :
caustic embrittlement, 167*A*.
welded, heat treatment, 199*A*.
welding, 292*A*.
BOILER TUBES :
corrosion, 58*A*.
failure, 160*A*.
BOILERS :
use of pulverised coal, 174*A*.
water-tube, 124*A*.

BOILERS (*contd.*)—
welding, 150*A*.
welding, specifications, American, 27*A*., 150*A*.
BOLTS:
brittleness at high temperatures, 300*A*.
creep, 301*A*.
manufacture, 14*A*.
"Newall Hitensile," 14*A*.
"Newalloy," 14*A*.
BONDING CLAY, tests, 180*A*.
BOOK NOTICES:
American Institute of Mining & Metallurgical Engineers, "Transactions. Vol. 135. Iron and Steel Division," 216*A*.
American Society for Metals, "Modern Steels," 268*A*.
Buell, W. C., jun., "The Open-Hearth Furnace," vol. 3, 112*A*.
Camm, F. J., "Dictionary of Metals and their Alloys," 315*A*.
"Centraal Instituut voor Materiaalonderzoek," Mededeling No. 19, 315*A*.
Chalmers, B., "The Physical Examination of Metals," vol. 1, 113*A*.
Cookson, W., and A. Bold, "Elements of Sheet-Metal Work," 60*A*.
Dearden, J., "Iron and Steel Today," 168*A*.
Greaves, R. H., and H. Wrighton, "Practical Microscopical Metallography," Third ed., 168*A*.
Hanemann and Schrader, "Atlas Metallographicus," Band II., 60*A*.
Hudson, J. C., "Corrosion of Iron and Steel," 269*A*.
Moon, A. Ramsay, "Design of Welded Steel Structures," 61*A*.
Mott, R. A., and R. V. Wheeler, "The Quality of Coke," 169*A*.
Reams, C. E., "Modern Blast Cleaning and Ventilation," 62*A*.
Remington, J. S., and F. L. Jamieson, "Metallurgical Analysis and Assaying," 269*A*.
Rosenberger, W. A., "Impact Cleaning," 316*A*.
Taylor, E. R., "Definitions and Formulæ for Students (Metallurgy)," 170*A*.
BOOK NOTICES (*contd.*)—
White, A. H., "Engineering Materials," 216*A*.
Williams, R. S., and V. O. Homerberg, "Principles of Metallography," Fourth ed., 171*A*.
BORG-WARNER CORPORATION, heat-treatment plant, 194*A*.
BORON:
effect in cast iron, 208*A*.
effect in steel, welding, 294*A*.
BRASS, transformations, 127*P*.
BRAZING, chromium steel, 93*A*.
BREEZE, coke, use in producers, 226*A*., 273*A*.
BRIGHTNESS, metals, determination, 247*A*.
BRIQUETTES, use in cupolas, 76*A*., 129*A*.
BRITISH CAST IRON RESEARCH ASSOCIATION, recommendations for grading pig irons, 8*A*.
BRITTLENESS, chromium-molybdenum-nickel steel at high temperatures, 300*A*.
BROKEN HILL PROPRIETARY CO., LTD., history of development, 75*A*.
BRONZE WELDING, cast iron, 26*A*.
BROWN-BOVERI ELECTRIC FURNACE, 136*A*.
BURNERS:
for forge furnaces, 85*A*.
gas, mixing process, 223*A*.
BURNING, during welding of sheets, 25*A*., 150*A*.
BUTANE, use for cutting steel, 245*A*.

CADMIUM, effect in steel, welding, 294*A*.
CADMIUM COATINGS:
effect on corrosion fatigue, 56*A*.
thickness measurement, 30*A*., 155*A*.
CALCIUM CARBIDE, desulphurisation of iron, 183*A*.
CALCIUM CARBONATE, reactions with iron sulphides, 228*A*.
CALCIUM NITRATE, corrosion of steel, 57*A*.
CALCIUM SILICIDE, addition to cast iron, 43*A*.
CALCIUM-SODIUM CARBONATE, reaction with iron sulphide, 228*A*.
CAMBRIDGE UNIVERSITY, corrosion research, 219 *Paper*.
CANADA, iron ore reserves, 410*P*.
CARBANALYZER, use for determination of carbon, 214*A*.

CARBIDES :
solution in steel, 49*A*.
vanadium, in vanadium steel, 309*A*.
CARBON :
determination in cast iron, 214*A*.
determination in iron and steel, Baryte process, 109*A*.
determination in liquid steel, use of carbanalyzer, 214*A*.
effect in forged steel, machinability, 202*A*.
effect in steel, cutting properties, 201*A*.
effect in steel, isothermal transformations, 211*A*.
effect in steel, oxidation, 21*A*.
effect in steel, welding, 26*A*.
effect in steel, welding, bibliography, 26*A*.
CARBON DIOXIDE :
effect on dissociation of carbon monoxide, 71*A*.
occurrence during oxy-acetylene welding, 292*A*.
CARBON MONOXIDE :
dissociation, effect of elements, 71*A*.
occurrence during oxy-acetylene welding, 292*A*.
reduction of iron ore, 178*A*.
CARBON STEEL :
creep, 253*A*., 301*A*.
damping capacity. 157*P*.
hardenability, 308*A*.
hardening, 23*A*.
spot welding, 149*A*.
time-elongation curves, 99*A*.
CARBONATES, reactions with iron sulphide, 227*A*.
CARBONEUTRAL SALT BATHS, 89*A*.
CARBONISATION :
coal, crystallite growth, 174*A*.
Curran-Knowles process, 175*A*.
electric method, 69*A*.
low-temperature, Disco process, 273*A*.
CARBURISATION :
effect of clay packing on sulphide inclusions in steel, 190*A*.
gas, 19*A*.
use of cyanide baths, 89*A*.
CARBURISING FURNACES, 186*A*.
CARNEGIE-ILLINOIS STEEL CORPORATION :
blast-furnace practice, 7*A*.
rolling-mill plant, 18*A*., 141*A*.
CARNEGIE SILVER MEDAL, awarded to O. W. L. Ljunggren, 7*P*.
CARPENTER CENTRIFUGE, 223*A*.
CASE-HARDENING, 241*A*.
effect on fatigue strength, 40*A*.
use of witherite, 241*A*.
CASE-HARDENING STEEL, manganese, as substitute for chromium-molybdenum steel, 256*A*.
CAST IRON :
alloy additions, 129*A*.
alloy additions with calcium silicide, 43*A*.
aluminium-chromium, Cralfer, 276*A*.
analysis, spectrum, 109*A*.
bronze welding, 26*A*.
castability, 232*A*., 275*A*.
chromium-nickel, properties, 208*A*.
chromium-silicon, properties, 303*A*.
corrosion in saline, effect of temperature, 54*A*.
damping properties, 205*A*.
determination of carbon and silicon, 214*A*.
effect of boron, 208*A*.
effect of cerium, 208*A*.
effect of cobalt, 208*A*.
effect of copper, 302*A*.
effect of elements, 129*A*.
effect of ladle additions, 258*A*.
effect of titanium, 208*A*.
effect of vanadium, 303*A*.
fatigue strength, 296*A*.
flame-hardening, 89*A*., 289*A*.
gases in, 207*A*.
graphite additions in ladle, 9*A*.
graphitisation, effect of copper and nickel, 44*A*.
heat treatment, 89*A*.
high-duty, Lanz-Perlit process, 276*A*.
high-duty, production, 180*A*.
impact strength, 296*A*.
internal stresses, 203*A*.
ladle additions, 9*A*.
malleable. *See* Malleable Cast Iron.
manufacture in electric furnaces, 77*A*., 129*A*., 230*A*.
Meehanite, flame-hardening, 241*A*.
Meehanite, production, 276*A*.
Meehanite, properties, 259*A*.
melting, 230*A*.
Ni-tensyl production, 276*A*.
pearlitic, effect of phosphorus, 101*A*.
polishing, electrolytic, 260*A*.
properties, 43*A*.
relations between melting technique, structure and properties, 76*A*.
specification, French, 163*A*.

CAST IRON (*contd.*)—
turning, 202*A*.
wear, 252*A*.
"white" constituents, evaluation, 164*A*.
CAST-IRON CRANKSHAFTS, properties, 44*A*.
CAST-IRON PIPES, design, 304*A*.
CAST STEEL, properties, 163*A*.
CASTABILITY :
alloy-steel castings, 181*A*.
cast iron, 232*A*., 275*A*.
steel, 231*A*.
CASTING, centrifugal, pipes, 10*A*., 126*A*.
CASTING MACHINES, pig iron, 178*A*.
CASTING PITS, refractory materials, 123*A*.
CASTINGS :
alloy steel, castability, 181*A*.
chromium steel, properties, 161*A*., 256*A*.
cleaning, 78*A*.
copper-silicon steel, production, 9*A*.
flat, "rat-tailing," 131*A*.
for enamelling, manufacture, 180*A*.
gates and runners, 78*A*.
gating and feeding, 276*A*.
iron, pouring time, 130*A*.
oil-engine, manufacture, 180*A*.
shrinkage and contraction, 181*A*.
solidification, 10*A*.
steel, applications, 46*A*.
steel, manufacture, 9*A*., 78*A*., 181*A*.
steel, welding, 151*A*.
thin, pouring, 131*A*.
welding, 199*A*.
CAUSTIC EMBRITTLEMENT, boiler plate, 167*A*.
CAUSTIC POTASH, use in heat treatment, 193*A*.
CAUSTIC SODA, use in heat treatment, 193*A*.
CEMENT, jointing. *See* Refractory Materials.
CEMENTITE :
hydrogen overvoltage, 55*A*.
structure, 144*P*.
CENTRIFUGAL CASTING, pipes, 10*A*., 126*A*.
CENTRIFUGES for drying coal, 223*A*.
CERIUM, effect in cast iron, 208*A*.
CHAINS, sling, properties, 304*A*.
CHARCOAL IRON, manufacture, history, 75*A*.
CHILE, iron ore composition, 412*P*.
CHLORINE, action on refractory materials, 121*A*.
CHROMANSIL STEEL, properties, 105*A*.
CHROME MAGNESITE BRICKS. *See* Refractory Materials.
CHROME ORE DEPOSITS, India, 221*A*.
CHROME REFRACTORIES. *See* Refractory Materials.
CHROMIUM :
determination in iron and steel, 109*A*., 214*A*., 215*A*.
effect in cast iron, 129*A*
effect in high-speed steel, cutting properties, 100*A*.
effect in steel, cutting properties, 201*A*.
effect in steel, isothermal transformations, 211*A*.
effect in tool steel, hardenability, 41*A*.
electrodeposition, dies and gauges, 32*A*.
electrodeposition, temperature control, 155*A*.
passivity, 267*A*.
CHROMIUM COATINGS :
effect on corrosion-fatigue, 56*A*.
porosity, 156*A*.
properties, 30*A*.
CHROMIUM-COBALT-TUNGSTEN ALLOYS, use for valve seats, 198*A*.
CHROMIUM-COPPER-MANGANESE STEEL, properties, 162*A*.
CHROMIUM-COPPER STEEL :
properties, 256*A*.
welding, 292*A*.
CHROMIUM-HARDENING :
Listard method, 206*A*.
Van der Horst method, 206*A*.
CHROMIUM MAGNET STEEL, heat treatment, 145*A*., 160*A*.
CHROMIUM-MANGANESE-NICKEL STEEL :
deformation resistance, 138*A*.
nitriding, 90*A*.
CHROMIUM-MANGANESE STEEL :
corrosion, 108*A*., 167*A*.
corrosion-resistance assessed by time-potential curve, 107*A*.
deep-drawing tests, 239*A*.
development in Germany, 303*A*.
properties, 257*A*.
CHROMIUM-MANGANESE-TUNGSTEN STEEL, nitriding, 90*A*.
CHROMIUM-MOLYBDENUM-NICKEL STEEL :
brittleness at high temperatures, 300*A*.
corrosion in phosphoric acid, 57*A*.
hardness tests, end-quench, 40*A*.
passivity, 108*A*.

CHROMIUM-MOLYBDENUM-NICKEL STEEL (*contd.*)—
relation between elongation on fracture and reduction of area, 95*A*.
CHROMIUM-MOLYBDENUM-NICKEL STEEL INGOTS, solidification, 235*A*.
CHROMIUM-MOLYBDENUM STEEL:
creep, 207*A*.
depth hardening properties, 97*A*.
development in Germany, 303*A*.
nitriding, 89*A*.
properties, 161*A*.
properties at low temperatures, 253*A*.
relation between elongation on fracture and reduction of area, 95*A*.
substitution by manganese case-hardening steel, 256*A*.
CHROMIUM-MOLYBDENUM STEEL CASTINGS, castability, 181*A*.
CHROMIUM-MOLYBDENUM STEEL TUBES, welding, 199*A*.
CHROMIUM-MOLYBDENUM-VANADIUM STEEL, time-elongation curves, 99*A*.
CHROMIUM-NICKEL CAST IRON, properties, 208*A*.
CHROMIUM-NICKEL STEEL:
acid resistance, 101*A*.
bright annealing, 242*A*.
castability, 181*A*.
cold-worked, transformations, 105*A*.
corrosion, intercrystalline, 55*A*.
corrosion-resistance assessed by time-potential curve, 107*A*.
corrosion tests, Huey method, 56*A*.
deep drawing tests, 239*A*.
depth-hardening properties, 97*A*.
development, 82*A*.
drop forging, 14*A*.
fracture, layer formation, 204*A*.
grain disintegration, effect of vanadium, 211*A*.
hardness tests, end-quench, 40*A*.
hot-rolling, 140*A*.
melting, use of titanium concentrate, 137*A*.
nitriding, 90*A*.
passivity, 108*A*.
polishing, electrolytic, 260*A*.
properties, 162*A*., 208*A*.
properties, effect of rolling conditions, 286*A*.
properties at low temperatures, 253*A*.
CHROMIUM-NICKEL STEEL (*contd.*)—
relation between elongation on fracture and reduction of area, 95*A*.
spot welding machines, 92*A*.
stress-corrosion cracking, 56*A*.
tensile properties, effect of previous deformation, 37*A*.
tensile properties, effect of work-hardening capacity, 296*A*.
welding, 25*A*.
CHROMIUM-NICKEL STEEL FORGINGS, flakes, 283*A*.
CHROMIUM-NICKEL STEEL INGOTS, solidification, 83*A*., 185*A*.
CHROMIUM-NICKEL SYSTEM, 94*P*.
CHROMIUM OXIDE, reactions with iron sulphide, 228*A*.
CHROMIUM-PHOSPHORUS STEEL, welding, 293*A*.
CHROMIUM-SILICON CAST IRON, properties, 303*A*.
CHROMIUM-SILICON STEEL, development in Germany, 303*A*.
CHROMIUM-SILICON-VANADIUM STEEL, properties, 257*A*.
CHROMIUM STEEL:
acid-resistance, 101*A*.
annealing, effect of original structure, 192*A*.
brazing, 93*A*.
corrosion in phosphoric acid, 57*A*.
deep-drawing tests, 239*A*.
determination of iron, 109*A*.
development in Germany, 303*A*.
drop-forging, 14*A*.
effect of molybdenum, 255*A*.
effect of molybdenum and vanadium, 46*A*.
properties, 256*A*.
spraying, 35*A*.
CHROMIUM STEEL CASTINGS, properties, 161*A*., 256*A*.
CHROMIUM-STEEL SCRAP, melting in electric furnaces, 281*A*.
CHROMIUM-TUNGSTEN STEEL, nitriding, 89*A*., 90*A*.
CHROMIUM-TUNGSTEN-VANADIUM STEEL, nitriding, 89*A*.
CHROMIUM-VANADIUM STEEL:
nitriding, 89*A*.
sclero-grating tests, 379*P*.
CLAD METALS:
deep-drawing, 247*A*.
manufacture, 33*A*., 156*A*., 247*A*.
CLAD STEEL:
manufacture and properties, 209*A*.
welding, 199*A*.
CLARK'S JET TEST, for measuring thickness of electrodeposited coatings, 154*A*., 155*A*.

CLAY, bonding, tests, 180*A*.
CLEANING :
blast-furnace gas, 437*P*., 176*A*.
castings, 78*A*.
coal, Barvoys plant, 68*A*.
coal, flotation, 173*A*.
coal, Stump method, 3*A*.
coal, Tromp process, 173*A*., 272*A*.
coal, use of dense media, 124*A*.
metals, 28*A*., 153*A*., 246*A*.
polished steel, 28*A*.
CLEVELAND, ironstone mining, 64*A*.
COAL :
American, coking properties, 4*A*., 68*A*., 174*A*.
banded constituents, hydrogenation, 69*A*.
carbonisation, crystallite growth, 174*A*.
carbonisation, Curran–Knowles process, 175*A*.
carbonisation, low-temperature, Disco process, 273*A*.
cleaning, Barvoys plant, 68*A*.
cleaning, flotation, 173*A*.
cleaning, Stump method, 3*A*.
cleaning, Tromp process, 173*A*., 272*A*.
cleaning, use of dense media, 124*A*.
coking tests, 224*A*., 272*A*.
combustion, effect of sulphur, 124*A*.
determination of pyrites and sulphur, 314*A*.
drying, centrifuges for, 223*A*.
hydrogenation, 226*A*.
pulverised, use under boilers, 174*A*.
pulverised, use in open-hearth furnaces, 3*A*.
South African, rational analysis, 272*A*.
swelling, 4*A*., 5*A*., 174*A*.
swelling tests, Baum–Heuser, 174*A*.
swelling tests, Koppers, 174*A*.
swelling tests, Nedelmann, 174*A*.
swelling tests, Sheffield University Laboratory, 174*A*.
swelling tests, United States Bureau of Mines, 174*A*.
COAL BLENDS, coking, 5*A*.
COAL-CLEANING PLANT :
André Dumont Colliery, 68*A*.
Glass Houghton and Castleford Collieries, 68*A*., 223*A*., 272*A*.
Pittsburgh Coal Co., 3*A*.
Société Anon. des Charbonnages de la Louvière, 272*A*.
COAL DEPOSITS, United States, 420*P*.
COAL GAS, action on refractory materials, 118*A*.
COAL MINING INDUSTRY, use of nickel alloys, 161*A*.
COATED SHEETS, deep-drawing, 247*A*.
COATING, metals, 29*A*., 154*A*., 247*A*.
COATINGS :
aluminium, 156*A*.
aluminium, on firebricks, 66*A*.
aluminium, on wire, 33*A*.
asbestos-cement, for tubes, 35*A*.
cadmium, thickness measurement, 30*A*., 155*A*.
chromium, porosity, 156*A*.
chromium, properties, 30*A*.
copper, porosity, 156*A*.
electrodeposited, adherence, 31*A*.
electrodeposited, porosity tests, 31*A*.
electrodeposited, thickness measurement, Clark's jet test, 154*A*., 155*A*.
electrodeposited, X-ray examination, 31*A*.
enamel, thickness measurement, 248*A*.
metallic, effect on corrosion-fatigue, 56*A*.
nickel, porosity, 156*A*.
nickel, properties, 30*A*.
non-magnetic, thickness measurement, 97*A*., 155*A*.
paint, adherence to galvanised iron, 249*A*.
paint, protective value, 229*P*.
protective, detection of defects, 29*A*.
protective, French research, 36*A*.
protective, production from gaseous or vapour phase, 154*A*.
protective, relative values, 310*A*.
protective, Russian research, 154*A*.
protective, thickness measurement, 30*A*.
protective, thickness measurement, B.N.F. jet test, 30*A*.
zinc, production, 33*A*.
zinc, tests, British specification, 248*A*.
zinc, thickness measurement, 30*A*., 155*A*.
COBALT :
determination in iron and steel, 214*A*., 311*A*.
effect in cast iron, 208*A*.
effect in steel, isothermal transformations, 211*A*.
effect in steel, welding, 294*A*.
COBALT-NICKEL SYSTEM, 95*A*.
COGGING MILLS, 18*A*.
output capacity, 88*A*.
COILERS, for strip, 240*A*.

COKE :
combustibility, 273*A*.
cracks in, 226*A*.
determination of sulphur, 314*A*.
lustre and reflective characteristics, 225*A*.
pitch, production, 225*A*.
properties, 175*A*.
properties, effect on blast-furnace practice, 227*A*.
COKE BREEZE, use in producers, 226*A*., 273*A*.
COKE-OVEN GAS :
carburetted, use in open-hearth furnaces, 69*A*.
recovery of sulphur, 5*A*.
use in steel industry, 125*A*.
COKE OVENS :
Becker, 4*A*., 223*A*.
design, 272*A*.
flame temperature, 224*A*.
heated by producer gas, 223*A*.
COKERIES DE LA SEINE, coking plant, 223*A*.
COKING, coal blends, 5*A*.
COKING INDUSTRY, United Kingdom, 272*A*.
COKING PLANTS :
Cokeries de la Seine, 223*A*.
John Lysaght, Ltd., 4*A*.
Stewarts and Lloyds, Ltd., 4*A*., 174*A*.
Richard Thomas & Co., Ltd., 6*A*.
COKING PRACTICE, rate of heating, 224*A*.
COKING PROPERTIES, American coal, 4*A*., 68*A*., 174*A*.
COKING TESTS, coal, 224*A*., 272*A*.
COLD-DRAWING, wire rods, 284*A*.
COLD-HEADING, wire, 284*A*.
COLD-ROLLING :
cooling of rolls, 88*A*.
sections, 189*A*.
stainless steel, 18*A*.
COLD-ROLLING MILLS, 18*A*.
backing rolls for, 88*A*.
output capacity, 240*A*.
COLD-WORK :
sensitivity of steel, 47*A*.
theories, 38*A*.
COLD-WORKED CHROMIUM-NICKEL STEEL, transformations, 105*A*.
COLD-WORKED METALS, X-ray examination, 47*A*.
COLD-WORKING, steel, 238*A*.
COMBUSTIBILITY, coke, 273*A*.
COMBUSTION, control, 3*A*.
COMMONWEALTH ROLLING MILLS PROPRIETARY, LTD., rolling-mill plant, 188*A*.
COMPOSITE INGOTS, manufacture, 131*A*.
COMPOSITE STEEL, manufacture, Pluramelt process, 282*A*.
COMPOSITION, as indication of properties of steel, 163*A*.
COMPRESSIBILITY, moulding sand, 130*A*.
CONDUCTIVITY :
thermal, determination, 2*A*.
thermal, metals, 207*A*.
CONTINENTAL STEEL CORPORATION, steel plant, 278*A*.
CONTRACTION, castings, 181*A*.
CONTROL :
combustion, 3*A*.
fuel gases, system at plant of Ford Motor Co., 125*A*.
furnace temperatures, 143*A*.
moulding sand, 130*A*.
open-hearth furnaces, 12*A*., 133*A*.
temperatures in chromium plating, 155*A*.
CONVERTERS :
basic Bessemer, effect of nitrogen in steel on age of lining, 11*A*.
basic Bessemer, use of oxygen-enriched blast, 79*A*.
Bessemer, blowing at constant pressure, 133*A*.
Tropenas, electric, 137*A*.
COOLING BANKS for heavy sections, 87*A*.
COOLING RATE :
effect on vanadium steel, 212*A*.
welds, effect on hardness and structure, 245*A*.
COPPER :
effect in cast iron, 129*A*., 302*A*.
effect in cast iron, graphitisation, 44*A*.
effect in steel, 102*A*., 304*A*.
effect in steel, cutting, 201*A*.
effect in structural steel, 100*A*.
electrolytic, properties at low temperatures, 253*A*.
properties at high temperatures, 43*A*.
COPPER ALLOYS, corrosion in phosphoric acid, 57*A*.
COPPER-COATED SHEETS, deep drawing, 247*A*.
COPPER COATINGS :
effect on corrosion-fatigue, 56*A*.
porosity, 156*A*.
COPPER-GOLD ALLOYS :
resistance-temperature curve, 131*P*.
specific-heat/temperature curve, 123*P*.

COPPER-MANGANESE STEEL, welding, 293*A*.
COPPER-NICKEL SYSTEM, 95*A*.
COPPER-SILICON-STEEL CASTINGS, production, 9*A*.
COPPER-SILVER ALLOYS :
hardness-temperature curves, 139*P*.
specific-heat/temperature curves, 139*P*.
COPPER STEEL :
corrosion, 58*A*.
precipitation hardening, 159*A*.
welding, 26*A*., 292*A*.
welding, bibliography, 26*A*.
CORES :
displacement in moulds, 276*A*.
oil sand, effect of inefficient drying on defects in castings, 130*A*.
" CORRONITE-COATED " STEEL, 156*A*.
CORROSION :
aluminium-chromium steel, 58*A*.
boiler tubes, 58*A*.
cast-iron in saline, effect of temperature, 54*A*.
central heating installations, 266*A*.
chromium-manganese steel, 108*A*., 167*A*.
chromium-molybdenum-nickel steel in phosphoric acid, 57*A*.
chromium steel in phosphoric acid, 57*A*.
copper alloys in phosphoric acid, 57*A*.
copper steel, 58*A*.
determination of commencement, 56*A*.
effect of scratch-line on protective character of oxide films, 224*P*.
electrochemical character, 220*P*.
electrolytic iron in saline, effect of temperature, 54*A*.
electron diffraction study, 107*A*.
equipment used in manufacture of phosphoric acid, 57*A*.
ferroxyl indicator, 266*A*.
intercrystalline, chromium-nickel steel, 55*A*.
intercrystalline, steel, 55*A*.
iron, effect of dust, 59*A*.
iron-silicon alloys in phosphoric acid, 57*A*.
metals, effect of treatment of water, 59*A*.
metals in gas combustion products, 166*A*.
metals in soil, 167*A*.
metals in water, 166*A*.
nickel alloys, in phosphoric acid, 57*A*.
petrol refinery equipment, 57*A*.
CORROSION (*contd.*)—
pipes by stray currents, methods of protection, 58*A*.
pipes in soil, 266*A*.
potential distribution over surfaces, 220*P*.
protective methods, 310*A*.
relation to mechanical properties, 53*A*.
rôle of potential and *p*H value, 54*A*.
ships, 59*A*.
steel, effect of grain size, 310*A*.
steel, effect of inclusions, 55*A*.
steel in alkalis, 107*A*.
steel in nitrates, 57*A*.
steel in salt solutions, 58*A*.
steel in sea water, 58*A*.
superheater tubes, 58*A*.
tinplate, 232*P*., 57*A*.
use and interpretation of potential measurements, 54*A*.
welds, 57*A*.
CORROSION-FATIGUE :
prevention by zinc, 232*P*.
steel, effect of metallic coatings, 56*A*.
CORROSION-FATIGUE TESTS, short-time, 252*A*.
CORROSION PRODUCTS, galvanised sheets, 267*A*.
CORROSION RESEARCH :
Belgium, 53*A*.
Cambridge University, 219 *Paper*.
England, 53*A*.
France, 53*A*.
CORROSION RESISTANCE, steel, assessed by time-potential curves, 107*A*.
CORROSION TESTS :
atmospheric, long-time, 54*A*.
chromium-nickel steel, Huey method, 56*A*.
combined mist and rain chamber, 310*A*.
salt spray, 56*A*.
stainless steel, 56*A*.
standardisation in Germany, 53*A*.
COSTS, transports of raw materials for blast-furnaces in America, 426*P*.
COUNCIL REPORT, 19*P*.
CRACKING, stress-corrosion, chromium-nickel steel, 56*A*.
CRACKS :
effect on calculated nominal stress of specimen subjected to constant bending moment, 250*A*.
fatigue, in axles, 96*A*.
fatigue, in springs, 96*A*.
internal, in forgings, 138*A*.

CRACKS (*contd.*)—
in quenched steel, 290*A*.
shatter, in steel, preventing, 39*A*.
in welded sheets, 201*A*.
in welds, 292*A*.
CRALFER CAST IRON, 276*A*.
CRANKSHAFTS :
cast iron, properties, 44*A*.
damping properties, 205*A*.
nitriding, distortion, 192*A*.
torsion fatigue tests, 252*A*.
CREEP :
alloy steel, 42*A*.
bolts, 301*A*.
carbon steel, 253*A*.
chromium-molybdenum steel, 207*A*.
determination of limiting deformation and limiting stress, 301*A*.
metals, 42*A*.
molybdenum steel, 253*A*., 301*A*.
steel, 301*A*.
CREEP CURVES, application, 301*A*.
CREEP TESTING MACHINES, 99*A*.
CREEP TESTS, short time, 43*A*., 99*A*.
CROLOY BONDED PLATE, 33*A*., 248*A*.
CROSSLEY WIRE-DRAWING MACHINE, 16*A*.
CRUCIBLES :
manufacture, 172*A*.
manufacture by slip-casting, 1*A*.
CRYSTALS :
single, deformation, 38*A*.
single, preparation, 306*A*.
CUBA :
iron-ore composition, 412*P*.
iron-ore reserves, 410*P*.
CUMBERLAND, iron-ore deposits, 221*A*.
CUPOLA LININGS, monolithic, 123*A*.
CUPOLAS :
balanced-blast, 275*A*.
bottoms, fastening, 275*A*.
melting of cold-blast and special-quality iron, 76*A*.
metal losses, 275*A*.
reactions, 77*A*., 129*A*.
use of briquettes, 76*A*., 129*A*.
use of fluorspar, 275*A*.
CURRAN-KNOWLES CARBONISATION PROCESS, 175*A*.
"CUTANIT," 94*A*.
CUTTING :
flame, 27*A*.
oxy-acetylene, metallurgy, 201*A*.
plates, preparation for welding, 201*A*., 292*A*.
steel, use of butane, propane and acetylene, 245*A*.
CUTTING MATERIALS, preparation and properties, 94*A*., 202*A*.
CUTTING TOOLS, forging, 15*A*.
CYANIDE BATHS, use for carburisation, 89*A*.
CYANIDES, use in nitriding high-speed steel, 20*A*.
CYLINDER BLOCKS, manufacture, 180*A*.
CYLINDER LINERS, internal stresses, 203*A*.
CYLINDERS, wear, 42*A*., 206*A*.
CYPRITIC STEEL, properties, 257*A*.

DAMPING CAPACITY :
steel, Föppl-Pertz machine, 160*P*.
steel, measurement, 157 *Paper*.
DAMPING PROPERTIES, cast iron, 205*A*.
DARWINS, LTD., rolling-mill plant, 18*A*.
DECARBURISATION :
pig iron, R.K. process, 73*A*.
steel, effect of elements, 20*A*.
transformer steel, on annealing in hydrogen, 144*A*.
DECARBURISED ZONES, depth measurement, 305*A*.
DEEP DRAWING :
coated sheets, 247*A*.
power requirements, 15*A*.
stainless steel, 304*A*.
tools for, 15*A*., 86*A*., 138*A*.
DEEP-DRAWING TESTS, 15*A*., 187*A*., 237*A*., 238*A*.
Erichsen, 239*A*.
DEFECTOSCOPE, electron, for detection of defects, 260*A*.
DEFECTS :
billets and sheets, 185*A*.
detection by electron defectoscope, 260*A*.
detection by magnetic means, 103*A*., 210*A*., 261*A*., 305*A*.
detection in protective coatings, 29*A*.
DEFORMATION :
effect on magnetic properties, 99*A*.
effect on quenching of spring steel, 195*A*.
metals, 38*A*.
plastic, fundamentals, 283*A*.
prolonged, effect on rail steel, 98*A*.
resistance of structural steel, 138*A*.
DEGREASING MACHINES, 153*A*.
DEOXIDATION :
steel, 81*A*.
steel, aluminium used, 136*A*.
DESCALING, metals, 153*A*.
DESULPHURISATION :
iron, 227*A*., 280*A*.
iron, by calcium carbide, 183*A*.

DIE STEEL, annealing, effect of original structure, 192*A*.
DIES :
blanking, design, 15*A*.
chromium plating, 32*A*.
drawing, flow of metal, 15*A*.
drawing, trouble due to faulty design, 15*A*.
heat treatment, 194*A*.
stamping, quenching, 147*A*.
DIFFUSION :
hydrogen in steel, 259*P*.
in metals, effect of structure, 48*A*.
DIRECT PROCESSES :
Krupp-Renn, 74*A*., 127*A*.
Rennerfelt-Kalling, 6*A*.
DISCO CARBONISATION PROCESS, 273*A*.
DRAWING :
cold, wire rods, 284*A*.
stainless steel wire, 139*A*.
wire, 138*A*., 187*A*., 284*A*.
DRAWING DIES :
flow of metal, 15*A*.
trouble due to faulty design, 15*A*.
DRAWING MACHINES :
wire, 86*A*.
wire, Barcro, 187*A*.
wire, Crossley, 16*A*.
DRILL STEEL, heat treatment, 22*A*.
DROP-FORGING :
chromium-nickel steel, 14*A*.
chromium steel, 14*A*.
Monel metal, 14*A*.
DRYING, coal, centrifuges for, 223*A*.
DUDDON FURNACE, blowing mechanism, 8*A*.
DUISBURG KUPPERHÜTTE, pig-casting machine, 178*A*.
DUPLEX PROCESS :
Bessemer converters and electric furnaces, 281*A*.
manganese loss, 81*A*.
manufacture of rimming steel, 281*A*.
DYNAMO STEEL, annealing, 242*A*.

EDELSTAHL-VERBAND, history, 136*A*.
EKKO PROCESS of electroforming, 155*A*.
ELASTICITY, theories, 203*A*.
ELASTICITY MODULUS, alloys, 295*A*.
ELECTRIC CURRENTS, use in heat treatment, 147*A*., 191*A*., 194*A*., 243*A*.
ELECTRIC DRIVING, strip mills, 142*A*.
ELECTRIC FURNACE PRACTICE, 184*A*.
ELECTRIC FURNACES :
arc, operation, 81*A*.
ELECTRIC FURNACES (*contd.*)—
Brown-Boveri, 136*A*.
coreless induction, development in Germany, 235*A*.
coreless induction, oxidation losses, 184*A*.
Elektrometall, 6*A*.
Girod, 82*A*.
Héroult, 82*A*.
high-frequency, 82*A*.
high-frequency, manufacture of steel, slag manipulation, 235*A*.
inclined walls, 136*A*.
Kjellin, 82*A*.
manufacture of cast iron, 77*A*., 129*A*., 230*A*.
manufacture of ferro-molybdenum, 274*A*.
melting of chromium-steel scrap, 281*A*.
Nathusius, 82*A*.
refractory materials, 222*A*.
Röchling-Rodenhauser, 82*A*.
Stassano, 82*A*.
top-charge type, 235*A*.
Tysland-Hole, 6*A*.
ELECTRICAL INDUSTRY, fatigue problems, 97*A*.
ELECTRICAL PROPERTIES, silicon steel, 300*A*.
ELECTRODEPOSITED COATINGS :
adherence, 31*A*.
porosity tests, 31*A*.
thickness measurement, Clark's jet test, 154*A*., 155*A*.
X-ray examination, 31*A*.
ELECTRODEPOSITION :
British practice, 29*A*.
chromium, dies and gauges, 32*A*.
chromium, temperature control, 155*A*.
complex cations in plating baths, 32*A*.
current density ranges, 29*A*.
French practice, 29*A*.
hydrogen-ion concentration in cyanide baths, measurement, 29*A*.
hydrogen-ion concentration indicators, 154*A*.
lead, 35*A*.
molybdenum, 32*A*.
nickel, 156*A*.
nickel, effect of organic compounds, 247*A*.
silver, 33*A*.
tin, 35*A*.
tin, on strip, 248*A*.
zinc, 34*A*.

ELECTRODES :
welding, behaviour of mild steel wire, 197*A*.
welding, characteristics, 291*A*.
welding, effect of manganese, 198*A*.
welding, efficiency, 148*A*.
welding, manufacture, 291*A*.
welding, relation to weld metal, 148*A*.
welding, tin-coated, 92*A*., 150*A*.
ELECTROFORMING, Ekko Process, 155*A*.
ELECTROLYTE FILMS, character, 31*A*.
ELECTROLYTIC COPPER, properties at low temperatures, 253*A*.
ELECTROLYTIC IRON :
corrosion in saline, effect of temperature, 54*A*.
manufacture, 179*A*.
ELECTROLYTIC MANGANESE, manufacture, 73*A*.
ELECTROLYTIC PICKLING, 153*A*.
ELECTROLYTIC POLISHING, stainless steel, 246*A*.
ELECTRON DEFECTOSCOPE for detection of defects, 260*A*.
ELECTRON DIFFRACTION STUDIES, corrosion of iron, 107*A*.
ELEKTROLEN, 146*A*.
ELEKTROMETALL FURNACE, 6*A*.
ELONGATION, relation to reduction in area, 95*A*.
EMBRITTLEMENT, caustic, boiler-plate, 167*A*.
ENAMEL COATINGS, thickness measurement, 248*A*.
ENAMELLING, sheets, 157*A*.
ENAMELLING IRON, strength, effect of enamel, 249*A*.
ENAMELS :
effect on strength of enamelling iron, 249*A*.
tests for acid resistance, 157*A*.
Young's modulus, effect of humidity, 248*A*.
ENDURANCE TESTS, welded joints, 151*A*.
ENGINES, automobile, production, 231*A*.
EQUILIBRIUM DIAGRAMS :
ferrous alloys, effect of alloying elements, 105*A*.
X-ray analysis, 70*P*.
ERICHSEN DEEP-DRAWING TESTS, 239*A*.
ESSLING CRANKSHAFT IRON, properties, 45*A*.
ETCHING :
heat, for revealing grain size, 47*A*.
steel, for detecton of fatigue, 205*A*.
EXPLOSION :
acetylene-air mixtures, prevention by dilution, 197*A*.
acetylene-oxygen mixtures, pressures occurring, 197*A*.

FAILURE :
boiler tubes, 160*A*.
locomotive tyres, 251*A*.
FATIGUE :
corrosion-, prevention by zinc, 232*P*.
corrosion-, steel, effect of metallic coatings, 56*A*.
electricity-generating machinery, 97*A*.
press tools, effect of surface condition, 204*A*.
steel, detection by etching, 205*A*.
structural steel, 205*A*.
FATIGUE CRACKS :
in axles, 96*A*.
in springs, 96*A*.
FATIGUE STRENGTH :
cast iron, 296*A*.
drilled and notched specimens, 40*A*.
effect of case-hardening, 40*A*.
effect of nitriding, 252*A*.
effect of pickling, 39*A*.
fillet welds, 200*A*.
increase by surface pressing, 297*A*.
killed steel, 297*A*.
relation to tensile strength, 252*A*.
rimming steel, 297*A*.
riveted joints, 252*A*.
semi-killed steel, 297*A*.
springs, effect of surface condition, 298*A*.
torsional, fillet welds, 93*A*.
torsional, steel, effect of stress range, 158*A*.
weld metal, 294*A*.
welded joints, 93*A*., 252*A*.
wire, effect of rest periods, 251*A*.
FATIGUE TESTING MACHINES, 158*A*.
for locomotive frames, 96*A*.
FATIGUE TESTS, 251*A*.
bend, 252*A*.
corrosion-, short-time, 252*A*.
torsion, crankshafts, 252*A*.
wire, 96*A*.
FERRITE, detection in austenitic steel by magnetic means, 207*A*.
FERRO-ALUMINIUM, manufacture, reduction of alumina, 73*A*.
FERROMAGNETIC PHASES, determination, 206*A*.
FERROMAGNETISM, fundamentals, 99*A*.

FERRO-MANGANESE :
determination of iron, 109*A*.
melting furnace, 7*A*.
FERRO-MOLYBDENUM, manufacture in electric furnace, 274*A*.
FERRO-NIOBIUM, determination of tantalum and niobium, 111*A*.
FERRO-SILICON, manufacture, reduction of silica, 73*A*.
FERRO-TANTALUM, determination of tantalum and niobium, 111*A*.
FERRO-TANTALUM-NIOBIUM, determination of tantalum and niobium, 111*A*.
FERRO-VANADIUM, determination of iron, 311*A*.
FERROXYL INDICATOR, for corrosion, 266*A*.
FILMS :
electrolyte, character, 31*A*.
oxide, effect of scratch-line on protective character, 224*P*.
oxide, on metals, 266*A*.
oxide, on steel, 59*A*.
FIREBRICKS. *See* Refractory Materials.
FIRECLAY. *See* Refractory Materials.
FITTERER PYROMETER, 81*A*.
FLAKES :
in forgings, 283*A*.
in steel, prevention, 39*A*.
FLAME TEMPERATURE, coke-ovens, 224*A*.
FLOTATION :
coal, 173*A*.
iron ore, 65*A*.
FLOW :
gases through solid particles, heat transfer, 291 *Paper*.
metals, 295*A*.
metals, through drawing dies, 15*A*.
FLUIDITY. *See* Castability.
FLUORSPAR, use in cupolas, 275*A*.
FÖPPL-PERTZ MACHINE for measuring damping capacity, 160*P*.
FORD MOTOR CO. :
foundry plant, 276*A*.
gas control system, 125*A*.
heat-treatment department, 194*A*.
FORGE FURNACES, 186*A*., 187*A*.
burner for, 85*A*.
conversion from oil to gas firing, 85*A*.
FORGE STEEL, machinability, effect of carbon, 202*A*.
FORGING :
drop, chromium-nickel steel, 14*A*.
drop, chromium steel, 14*A*.
drop, Monel metal, 14*A*.
high-speed steel, 15*A*.
FORGING (*contd.*)—
rolls, 86*A*., 237*A*.
shells, 14*A*., 86*A*.
turbine rotors, 283*A*.
FORGING TEMPERATURES, 187*A*.
FORGINGS :
flakes, 283*A*.
heat-treatment furnaces, 187*A*.
internal cracks, 138*A*.
FORSTERITE. *See* Refractory Materials.
FOUNDRIES, steel, refactory materials, 222*A*.
FOUNDRY COSTING, 132*A*., 277*A*.
FOUNDRY INDUSTRY, Poland, 277*A*.
FOUNDRY PLANT :
Ford Motor Co., 276*A*.
General Motors Corp., 180*A*.
International Harvester Co., 231*A*.
Mack Manufacturing Corp., 180*A*.
Midland Electric Manufacturing Co., 181*A*.
Palestine, 277*A*.
FOUNDRY PRACTICE, 9*A*., 76*A*., 129*A*., 180*A*., 230*A*., 275*A*.
FRACTURE, chromium-nickel steel, layer formation, 204*A*.
FRANCE :
corrosion research, 53*A*.
electroplating practice, 29*A*.
research on protective coatings, 36*A*.
specifications for cast iron, 163*A*.
specifications for welded structures, 27*A*.
FREE-CUTTING STEEL, welding, 291*A*.
FREEZING, delayed, effect on ingots, segregation, 267*A*.
FRETZ MOON PROCESS, 141*A*., 189*A*.
FRICTION, internal, metals, 205*A*.
FUEL, pulverised. *See* Coal, pulverised.
FURNACE GASES, radiation, 124*A*.
FURNACES :
air circulation, 190*A*.
air, for manufacture of malleable cast iron, 77*A*.
blast-. *See* Blast-Furnaces.
electric. *See* Electric Furnaces.
heat losses, 3*A*., 68*A*.
heat-treatment. *See* Heat-Treatment Furnaces, Annealing Furnaces, &c.
high-temperature, sprung-arch roofs, 2*A*.
for melting ferro-manganese, 7*A*.
open-hearth. *See* Open-Hearth Furnaces.
reheating. *See* Reheating Furnaces and Soaking Pits.

FURNACES (*contd.*)—
slagging-test for refractory materials, 1*A*.
temperature control, 143*A*.
temperature measurement, 287*A*.

GALVANISED IRON, adherence of paints, 249*A*.
GALVANISED SHEETS :
corrosion products, 267*A*.
welding, use of tin-coated electrodes, 92*A*., 150*A*.
GALVANISING :
American practice, 35*A*.
iron and steel, 34*A*., 156*A*., 247*A*.
reactions of zinc and iron, 157*A*.
GAS :
analysis, micro-, 111*A*.
blast-furnace. *See* Blast-Furnace Gas.
coal, action on refractory materials, 118*A*.
coke oven. *See* Coke-Oven Gas.
combustion products, corrosion of metals, 166*A*.
long-distance, supply system in Ruhr, 176*A*.
long-distance, supply system in Silesia, 69*A*.
long-distance, turbo-blowers for, 226*A*.
metering, design of orifice plates, 273*A*.
producer. *See* Producer Gas.
GAS BURNERS, mixing process, 223*A*.
GAS INDUSTRY, use of nickel alloys, 161*A*.
GAS PRODUCERS. *See* Producers.
GASES :
in cast iron, 207*A*.
determination in steel, 208*A*.
evolution in steel manufacture, 280*A*.
flow through solid particles, heat transfer, 291 *Paper*.
furnace, radiation, 124*A*.
mixed, use in steel industry, 125*A*.
in steel, 208*A*.
GATES, for castings, 78*A*.
GATING, castings, 276*A*.
GAUGES, chromium plating, 32*A*.
GEARS :
flame hardening, 19*A*.
for heavy power transmission, 204*A*.
manufacture, 202*A*.
moulding, 230*A*.
tests, 253*A*.
GENERAL MOTORS CORPORATION :
chromium-plating practice, 32*A*.
foundry plant, 180*A*.
GERMANY :
coreless-induction furnaces, 235*A*.
development of alloy steels, 46*A*., 136*A*.
development of stainless steel, 303*A*.
heat balances of sintering plants, 65*A*.
iron industry, 74*A*., 75*A*., 179*A*.
iron-ore deposits, 221*A*.
iron-ore mining, 64*A*.
specifications for tar for tar-macadam, 72*A*.
standardisation of corrosion tests, 53*A*.
testing skill of welders, 291*A*.
GEVELING SURFACE-HARDENING PROCESS, 191*A*.
GIROD ELECTRIC FURNACE, 82*A*.
GJERS BLAST-FURNACE STOVE, 6*A*.
GLASS HOUGHTON AND CASTLEFORD COLLIERIES, coal-cleaning plant, 68*A*., 223*A*., 272*A*.
GRAIN BOUNDARIES, hardness tests, sclero-grating method, 341 *Paper*.
GRAIN DISINTEGRATION, chromium-nickel steel, effect of vanadium, 211*A*.
GRAIN GROWTH :
Benedicks and Löfquist theory, 48*A*.
Grossmann theory, 48*A*.
reaction kinetics, 103*A*.
in steel, effect of aluminium, vanadium and titanium, 104*A*.
GRAIN SIZE :
determination, 263*A*.
effect on magnetic properties, 42*A*.
effect in steel, 48*A*.
effect in steel, corrosion, 310*A*.
in steel, 165*A*.
in steel, bibliography, 48*A*.
in steel, McQuaid-Ehn test, 47*A*.
in steel, Shepherd P-F. Test, 47*A*.
Jernkontoret scale compared with Shepherd scale, 48*A*.
revealed by heat etching, 47*A*.
GRANULATION, soda-ash slag, 73*A*.
GRAPHITE, addition to cast iron in ladle, 9*A*.
GRAPHITISATION, cast iron, effect of copper and nickel, 44*A*.
GRAPHITISATION NODULES :
in malleable cast iron, determination, 164*A*.
rôle in annealing malleable cast iron, 262*A*.

GROSSMANN THEORY, of grain growth, 48*A*.
GRUNEWALD ANNEALING FURNACE, 145*A*., 242*A*.
GUEST, KEEN, BALDWINS IRON & STEEL CO., LTD., steel plant, 11*A*.
GUEST, KEEN & NETTLEFOLDS, LTD. :
  pickling plant, 28*A*.
  rolling-mill plant, 17*A*.
  steel plant, 11*A*.

HACK-SAW BLADES, manufacture, 289*A*.
HALL & PICKLES, LTD., steel plant, 11*A*.
HAMBORN CENTRIFUGE, 223*A*.
HARD SURFACING, 26*A*., 190*A*.
HARDENABILITY :
  carbon steel, 308*A*.
  effect of elements and heat treatment, 41*A*.
  manganese-molybdenum-silicon steel, 308*A*.
  molybdenum steel, 308*A*.
HARDENING :
  age-, metals, 41*A*.
  age-, metals, bibliography, 41*A*.
  axles, 194*A*.
  carbon steel, 23*A*.
  chromium-, Listard method, 206*A*.
  chromium-, Van der Horst method, 206*A*.
  flame, 145*A*., 190*A*.
  flame, applications, 241*A*.
  flame, automobile parts, 19*A*.
  flame, cast-iron, 89*A*., 289*A*.
  flame, efficiency of flames used, 190*A*.
  flame, gears, 19*A*.
  flame, lathe parts, 144*A*.
  flame, malleable cast iron, 289*A*.
  flame, Meehanite, 241*A*.
  flame, rollers, 19*A*.
  precipitation, copper steel, 159*A*.
  precipitation, iron-molybdenum alloys, 41*A*.
  precipitation, iron-tungsten alloys, 41*A*.
  selective, 20*A*.
  surface, 190*A*.
  valve tappets, 243*A*.
HARDNESS :
  effect on heat-treated steel, 41*A*.
  produced during welding, 151*A*.
  steel, effect of quenching methods, 23*A*.
  tempered steel, 40*A*.
HARDNESS (*contd.*)—
  welded joints, effect of preheating, 200*A*.
  welds, effect of cooling rate, 245*A*.
HARDNESS CONVERSION CHARTS, 41*A*.
HARDNESS-TEMPERATURE CURVES :
  aluminium-copper alloys, 140*P*.
  copper-silver alloys, 139*P*.
HARDNESS-TESTING MACHINE :
  Herbert cloudburst, 299*A*.
  Herbert pendulum, 299*A*.
  Kusnezow pendulum, Rehbinder's modification, 299*A*.
  Lips, 299*A*.
HARDNESS TESTS :
  end-quench, alloy steel, 40*A*.
  Rockwell, use of diamond-pyramid indenter, 299*A*.
  Rockwell, wire, 205*A*.
  sclero-grating method, 341 *Paper*.
  thin sheets, 97*A*.
HEADING, cold, wire, 284*A*.
HEAT :
  application in production of metals, 71*A*.
  effect in welding, 148*A*.
  latent, measurement, 42*A*.
  specific, iron-nickel alloys, 300*A*.
  specific, measurement, 42*A*.
  transmission, 3*A*.
HEAT BALANCES, ore-sintering plants, 65*A*.
HEAT CAPACITY, iron carbide, 207*A*.
HEAT INSULATION, physics, 3*A*.
HEAT LOSSES, furnace walls, 3*A*., 68*A*.
HEAT-RESISTANT STEEL :
  manufacture, 182*A*.
  properties, 207*A*.
  welding, 244*A*.
HEAT TRANSFER :
  in gas flow through solid particles, 291 *Paper*.
  in tubes, 68*A*., 223*A*.
HEAT-TREATED STEEL, properties, effect of hardness and temperature, 41*A*.
HEAT TREATMENT, 19*A*., 89*A*., 144*A*., 190*A*., 241*A*., 289*A*.
  bars, 23*A*.
  cast iron, 89*A*.
  chromium magnet steel, 160*A*.
  dies, 194*A*.
  drill steel, 22*A*.
  effect on tool steel, hardenability, 41*A*.
  high-speed steel, 165*A*.
  iron-nickel alloys, effect on magnetic properties, 300*A*.
  magnet steel, 145*A*.
  propeller shafts, 21*A*., 194*A*.

HEAT TREATMENT (*contd.*)—
shells, 21*A*.
stainless steel, 289*A*.
tools, 22*A*.
use of caustic soda, caustic potash, 193*A*.
use of electric currents, 147*A*., 191*A*., 194*A*., 243*A*.
use of salt baths, 89*A*.
welded boiler plate, 199*A*.
wire by electric current, 194*A*.
HEAT-TREATMENT FURNACES :
Ajax-Hultgren, 145*A*.
controlled atmospheres, 193*A*., 242*A*.
electric, 22*A*., 242*A*.
for forgings, 187*A*.
gas-fired, 90*A*.
salt-bath, 186*A*.
for strip, 147*A*.
for wire, 91*A*., 147*A*.
HEATING RATE, during coking, 224*A*.
HEATING TIME, steel spheres, 186*A*.
HERBERT HARDNESS-TESTING MACHINES, 299*A*.
HEROULT ELECTRIC FURNACE, 82*A*.
HIGH-FREQUENCY FURNACES. *See* Electric Furnaces.
HIGH-SPEED STEEL :
cutting properties, effect of vanadium and chromium, 100*A*.
forging, 15*A*.
heat treatment, 165*A*.
nitriding, use of molten cyanides, 20*A*.
substitute for, 194*A*.
tempering, 24*A*.
HISTORY, charcoal iron manufacture, 75*A*.
HOESCH PROCESS, manganese loss, 81*A*.
HOT-WORKING PROPERTIES, steel, 102*A*.
HUEY CORROSION TEST, 56*A*.
HYDROCARBON GASES, action on refractory materials, 118*A*.
HYDROCHLORIC ACID, action on refractory materials, 121*A*.
HYDROGEN :
annealing of transformer steel, decarburisation, 144*A*.
behaviour in steel manufacture, 233*A*.
determination in iron and steel, 311*A*.
determination in steel, 243 *Paper*.
determination in steel, vacuum-heating method, 248*P*.
diffusion in iron, 302*A*.
diffusion in steel, 259*P*.
HYDROGEN (*contd.*)—
effect in steel, 255*A*.
effect in steel, welding, 294*A*.
in liquid steel, 258*P*.
in steel, 208*A*.
HYDROGEN-ION CONCENTRATION :
measurement in plating baths, 29*A*.
rôle in corrosion, 54*A*.
HYDROGEN OVERVOLTAGE, metals, 55*A*.
HYDROGENATION :
banded constituents of coal, 69*A*.
coal, 226*A*.
HYDROGENATION PLANTS, use of nickel steel, 162*A*.
HYPERM, magnetic properties, 206*A*.

IGNITION RECTIFIERS, 142*A*.
IMPACT PROPERTIES, nickel steel at low temperatures, 38*A*.
IMPACT STRENGTH, cast iron, 296*A*.
IMPACT TESTS, torsion, stress-strain characteristics, 37*A*.
IMPACT VALUES, notched-bar, welded joints, 27*A*.
INCLUSIONS :
counting systems, 263*A*.
detection, slag-print method, 260*A*.
effect in steel, corrosion, 55*A*.
sulphide, in steel, effect of clay packing used in carburisation, 190*A*.
INCONEL, polishing, electrolytic, 260*A*.
INDIA :
chrome-ore deposits, 221*A*.
mineral deposits, 221*A*.
INGOT MOULDS :
design, effect on quality of bottom-poured ingots, 83*A*.
wall thickness, effect on solidification of ingots, 83*A*.
INGOTS :
blow-holes, effect of aluminium additions, 81*A*.
bottom-poured, effect of mould design on quality, 83*A*.
carbide segregation, 84*A*.
chromium-nickel steel, solidification, 83*A*., 185*A*.
composite, manufacture, 131*A*.
inverse segregation, 84*A*.
pouring, 81*A*.
rimming steel, solidification, 185*A*.
segregation, effect of anti-piping compounds, 263 *Paper*.
solidification, 13*A*., 235*A*.
solidification, effect of wall thickness of moulds, 83*A*.
INHIBITORS, use in pickling, 153*A*.

INLAND STEEL CO. :
blast-furnace plant, 274*A*.
galvanising plant, 34*A*.
INSULATING BRICK :
deformation under load, 172*A*.
use in gas- and coke-burning appliances, 118*A*.
INSULATION :
heat, physics, 3*A*.
terms used, British Standard definitions, 2*A*.
INTERNATIONAL DERRICK & EQUIPMENT CO., galvanising plant, 35*A*.
INTERNATIONAL HARVESTER CO., foundry plant, 231*A*.
IRON :
ancient, properties, 209*A*.
ancient, structure, 264*A*.
charcoal, manufacture, history, 75*A*.
corrosion, effect of dust, 59*A*.
desulphurisation, 227*A*., 280*A*.
desulphurisation by calcium carbide, 183*A*.
determination, 109*A*.
determination in ferro-vanadium, 311*A*.
diffusion of nitrogen, 302*A*.
electrolytic, corrosion in saline, effect of temperature, 54*A*.
electrolytic, manufacture, 179*A*.
enamelling, strength, effect of enamel, 249*A*.
high-purity, preparation, 7*A*., 274*A*.
magnetic properties, effect of deformation, 99*A*.
magnetic properties, effect of grain-size, grain-orientation and alloying elements, 42*A*.
magnetic properties, effect of stress, 98*A*.
polymorphism, effect of elements, 264*A*.
production, 6*A*., 70*A*., 126*A*., 177*A*., 227*A*., 274*A*.
pure, hydrogen overvoltage, 55*A*.
pure, properties at low temperatures, 253*A*.
reaction with zinc in galvanising, 157*A*.
recovery from soda-ash slag, 72*A*., 73*A*.
sintered, properties, 128*A*.
sponge, determination of iron oxide, 215*A*.
IRON ALLOYS, equilibrium diagrams, effect of alloying elements, 105*A*.
IRON-ALUMINIUM-COPPER SYSTEM, 108*P*.
IRON-ALUMINIUM-MANGANESE SYSTEM, aluminium corner, 212*A*.
IRON-ALUMINIUM-NICKEL SYSTEM, 102*P*., 106*A*.
IRON-ALUMINIUM SYSTEM, 82*P*.
IRON-ANTIMONY-COBALT SYSTEM, 212*A*.
IRON-BERYLLIUM-COBALT SYSTEM, 106*A*.
IRON CARBIDE, heat capacity and thermodynamic properties, 207*A*.
IRON-CARBON ALLOYS, transformations, austenite, 51*A*.
IRON-CHROMIUM ALLOYS :
acid resistance, 101*A*.
determination of nitrogen, 312*A*.
IRON-CHROMIUM-MANGANESE ALLOYS, properties, 256*A*., 257*A*.
IRON-CHROMIUM-MANGANESE SYSTEM, 212*A*.
sigma phase, 52*A*.
IRON-CHROMIUM-NICKEL ALLOYS, detection of ferrite by magnetic means, 207*A*.
IRON-CHROMIUM-NICKEL SYSTEM, 109*P*.
IRON-CHROMIUM SYSTEM, 94*P*.
IRON-COBALT-NICKEL SYSTEM, 109*P*.
IRON-COBALT SYSTEM, 94*P*.
IRON-COPPER ALLOYS, magnetic properties, 99*A*.
IRON-COPPER-NICKEL ALLOYS, recrystallisation, 103*A*.
IRON-COPPER-NICKEL SYSTEM, 108*P*.
IRON-COPPER SYSTEM, 95*A*.
IRON INDUSTRIES :
British, fuel efficiency, 175*A*.
German, 74*A*., 75*A*., 179*A*.
South Africa, 128*A*.
IRON/IRON-SILICIDE/TUNGSTEN DIAGRAM, 106*A*.
IRON-MANGANESE-CARBON SYSTEM, 264*A*.
IRON-MOLYBDENUM ALLOYS, precipitation hardening, 41*A*.
IRON-MOLYBDENUM-CARBON SYSTEM, 52*A*.
IRON-NICKEL ALLOYS :
magnetic properties, 99*A*.
magnetic properties, effect of grain-size, grain-orientation and alloying elements, 42*A*.
magnetic properties, effect of heat-treatment, 300*A*.
recrystallisation, 307*A*.
specific heat, 300*A*.
IRON-NICKEL SYSTEM, 90*P*.

IRON ORE :
composition, American, 412*P*.
determination of iron, 109*A*.
determination of silica, 313*A*.
evaluation, 274*A*.
flotation, 65*A*.
handling in Lake Superior District, 416*P*.
low-grade, smelting, 71*A*.
mining, Northamptonshire, 64*A*.
mining, Salzgitter Hills, 64*A*.
preparation in Lake Superior District, 414*P*.
production in United States, 411*P*.
reduction by carbon monoxide, 178*A*.
shipments in Lake Superior District, 415*P*.
sintering plants, heat balances, 65*A*.
spathic, roasted, magnetic properties, 65*A*.
titaniferous, behaviour in blast-furnace, 71*A*.
IRON ORE DEPOSITS :
Cumberland, 221*A*.
Germany, 221*A*.
New Zealand, 63*A*.
Queensland, 63*A*.
Spain, 221*A*.
United States, 408*P*.
IRON ORE RESERVES, America, 410*P*.
IRON OXIDE :
concentration in basic slag, 279*A*.
determination in sponge iron, 215*A*.
equilibrium in slag, 12*A*.
reduction at high temperatures, 126*A*.
IRON OXIDE ABSORPTION TESTS, refractory materials, 66*A*.
IRON-OXIDES/LIME SYSTEM, 13*A*.
IRON-OXIDES/SILICA SYSTEM, 12*A*.
IRON-OXYGEN DIAGRAM, 12*A*.
IRON-SILICON ALLOYS :
corrosion in phosphoric acid, 57*A*.
polishing, electrolytic, 260*A*.
solubility of nitrogen, 99*A*.
IRON-SILICON-VANADIUM DIAGRAM, 309*A*.
IRON AND STEEL INDUSTRIAL RESEARCH COUNCIL, research work, 203*A*.
IRON SULPHIDE, reactions with oxides, carbonates, silicates and phosphates, 227*A*.
IRON-TUNGSTEN ALLOYS, precipitation hardening, 41*A*.
IRONSTONE, mining, Cleveland, 64*A*.
JERNKONTORET GRAIN-SIZE SCALE, compared with Shepherd scale, 48*A*.

KENNAMETAL, 202*A*.
KJELLIN ELECTRIC FURNACE, 82*A*.
K.L. HIGH-SHOCK STEEL, 102*A*.
K.L. STRONGER STEEL, 102*A*.
KOPPERS SWELLING TEST, 174*A*.
KRUPP-RENN PROCESS, 74*A*., 127*A*.
KUSNEZOW TESTING MACHINE, Rehbinder's modification, 299*A*.
KUZNETSKY WORKS :
blast-furnace practice, 70*A*.
mixer plant, 136*A*.

LABORATORIES, metallurgical, 259*A*.
LADLES :
casting, with slag separators, 276*A*.
flow of steel through nozzles, 185*A*.
refractory materials, 222*A*.
stoppers, construction, 184*A*., 185*A*.
LAKE SUPERIOR DISTRICT :
iron ore composition, 413*P*.
iron ore deposits, 408*P*.
iron ore handling, 416*P*.
iron ore preparation, 414*P*.
iron ore shipments, 415*P*.
LANZ-PERLIT PROCESS, 276*A*.
LATENT HEATS, measurement, 42*A*.
LATHE PARTS, flame-hardening, 144*A*.
LAVES PHASES in metals, 165*A*.
LAYER FORMATION, in fracture of steel, 204*A*.
LEAD :
effect in steel, welding, 294*A*.
electrodeposition, 35*A*.
properties at low temperatures, 253*A*.
sclero-grating tests, 360*P*.
LEAD-BEARING STEEL, properties, 94*A*., 202*A*.
LEE, ARTHUR, & SONS, LTD., annealing furnaces, 22*A*., 145*A*., 242*A*.
LIGNOSTONE BEARINGS, 141*A*.
LIME, reactions with iron sulphide, 228*A*.
LINDBLOM BLAST-FURNACE STOVE, 6*A*.
LININGS :
blast-furnace, wear, 222*A*.
cupola, monolithic, 123*A*.
LIPS HARDNESS-TESTING MACHINE, 299*A*.
LISTARD METHOD of chromium hardening, 206*A*.

LOAD-TESTS, refractory materials at high-temperatures, 1*A*.
LOCOMOTIVE FRAMES, fatigue-testing machine, 96*A*.
LOCOMOTIVE TYRES, failure, 251*A*.
LOCOMOTIVES, welding, 26*A*., 150*A*.
LONDON, MIDLAND & SCOTTISH RAILWAY, welding and cutting practice, 26*A*.
LUBRICANTS :
effect on seizure of steel and bronze, 285*A*.
LUBRICATION, rolling mills, 17*A*., 188*A*., 240*A*.
LUKENS THERMAL STEEL, 198*A*.
LUNCHEON, report, 9*P*.
LYSAGHT BROS. & CO. PROPRIETARY, LTD., wire-drawing plant, 86*A*.
LYSAGHT, JOHN, LTD., coking plant, 4*A*.

MACHINABILITY :
forge steel, effect of carbon, 202*A*.
magnesium alloys, 202*A*.
Monel metal, 202*A*.
steel, 94*A*.
MACHINABILITY TESTING MACHINE, Oxford Airey, 202*A*.
MACHINE-TOOL INDUSTRY, uses of nickel, 100*A*.
MACK MANUFACTURING CORPORATION, foundry plant, 180*A*.
MCQUAID-EHN TESTS, 47*A*.
MAGNESITE :
origin and distribution, 66*A*.
See also Refractory Materials.
MAGNESIUM :
determination in aluminium, 313*A*.
effect in steel, welding, 294*A*.
MAGNESIUM ALLOYS, machinability, 202*A*.
MAGNESIUM OXIDE, reactions with iron sulphide, 228*A*.
MAGNET STEEL :
chromium, heat treatment, 160*A*.
heat-treatment, 145*A*.
MAGNETIC METHOD for sorting steel, 300*A*.
MAGNETIC PROPERTIES :
Hyperm, 206*A*.
iron, effect of deformation, 99*A*.
iron, effect of grain size, grain orientation and alloying elements, 42*A*.
iron, effect of stress, 98*A*.
iron-copper alloys, 99*A*.
iron-nickel alloys, 99*A*.
iron-nickel alloys, effect of heat treatment, 300*A*.
MAGNETIC PROPERTIES (*contd.*)—
Permalloy, 299*A*.
silicon steel, 300*A*.
spathic iron ore, 65*A*.
MAGNETIC TESTS, 103*A*., 160*A*., 210*A*., 261*A*., 305*A*.
NBS High-*H* Permeameter, 98*A*.
MAGNITOGORSK WORKS, open-hearth practice, 183*A*.
MALLEABLE CAST IRON :
air-furnace for, 77*A*.
annealing furnaces, 9*A*.
annealing, rôle of graphitisation nodules, 262*A*.
flame-hardening, 289*A*.
graphitisation nodules, determination, 164*A*.
manufacture, 129*A*., 180*A*.
properties, 45*A*.
MANGANESE :
determination in aluminium, 313*A*.
determination in iron and steel, 109*A*., 214*A*., 215*A*.
effect in cast iron, 129*A*.
effect in steel, 258*A*.
effect in steel, cutting, 201*A*.
effect in steel, isothermal transformations, 211*A*.
effect in welding electrodes, 198*A*.
electrolytic, manufacture, 73*A*.
equilibria in steel manufacture, 279*A*.
losses in open-hearth process, 81*A*.
use in metal industries, 63*A*.
MANGANESE CASE-HARDENING STEEL, as substitute for chromium-molybdenum steel, 256*A*.
MANGANESE-MOLYBDENUM-SILICON STEEL, hardenability, 308*A*.
MANGANESE ORE DEPOSITS, the World, 63*A*.
MANGANESE STEEL :
development, 82*A*.
properties, 161*A*.
transformations, 264*A*.
welding, 292*A*.
MANGANOUS OXIDE, reactions with iron sulphide, 228*A*.
MEEHANITE CAST IRON :
flame hardening, 241*A*.
production, 276*A*.
properties, 259*A*.
MELTING POINTS, slag, 12*A*.
MEMBERS, election, 2*P*.
METALLOGRAPHY AND CONSTITUTION, 47*A*., 103*A*., 164*A*., 210*A*., 260*A*., 305*A*.
METALLURGICAL RESEARCH, 164*A*.
METALLURGY, ferrous, developments, 210*A*.

METERING, gas, design of orifice plates, 273*A*.
METHANE, action on refractory materials, 121*A*.
MEXICO :
  blast-furnace plant, 406*P*.
  iron-ore composition, 412*P*.
  iron-ore reserves, 410*P*.
MIDLAND ELECTRIC MANUFACTURING Co., foundry plant, 181*A*.
MILLS, JAMES, LTD., steel plant, 278*A*.
MINERAL RESOURCES, 63*A*., 221*A*.
MINING :
  iron ore, Northamptonshire, 64*A*.
  iron ore, Salzgitter Hills, 64*A*.
  ironstone, Cleveland, 64*A*.
MINING INDUSTRY :
  Sweden, 64*A*.
  Upper Silesia, 221*A*.
  use of nickel alloys, 161*A*.
MIXERS, 136*A*.
MODULUS OF ELASTICITY, alloys, 295*A*.
MOLYBDENUM :
  addition to cast iron with calcium silicide, 43*A*.
  determination in iron and steel, 215*A*., 311*A*., 312*A*.
  effect in cast iron, 129*A*.
  effect in chromium steel, 46*A*., 255*A*.
  effect in steel, cutting properties, 201*A*.
  effect in steel, isothermal transformations, 211*A*.
  electrodeposition, 32*A*.
MOLYBDENUM STEEL :
  creep, 253*A*., 301*A*.
  determination of iron, 109*A*.
  hardenability, 308*A*.
  properties, 46*A*.
  time-elongation curves, 99*A*.
  use in oil refineries, 208*A*.
  welding, 293*A*.
MONEL METAL :
  drop-forging, 14*A*.
  machinability, 202*A*.
MORTARS, bonding. *See* Refractory Materials.
MOULDING :
  gears, 230*A*.
  ships' propellers, 131*A*.
MOULDING PRACTICE, without boxes, 78*A*.
MOULDING SAND :
  compressibility, 130*A*.
  control, 130*A*.
  synthetic, 230*A*.
  test, 276*A*.
MOULDS :
  core displacement, 276*A*.
  loam, preparation, 231*A*.
  permanent, 130*A*.
  venting, 130*A*.

NATHUSIUS ELECTRIC FURNACE, 82*A*.
NBS HIGH-*H* PERMEAMETER, 98*A*.
NEDELMANN SWELLING TEST, 174*A*.
NEW ZEALAND, iron-ore deposits, 63*A*.
NEWALL, A. P. & Co., LTD., bolt manufacture, 14*A*.
"NEWALL HITENSILE" BOLTS, 14*A*.
"NEWALLOY" BOLTS, 14*A*.
NEWFOUNDLAND :
  iron-ore composition, 412*P*.
  iron-ore reserves, 410*P*.
NEWPORT AND SOUTH WALES TUBE Co., LTD., plant, 18*A*.
NICKEL :
  determination in iron and steel, 214*A*, 312*A*.
  effect in cast iron, 129*A*.
  effect in cast iron, graphitisation, 44*A*.
  effect in steel, cutting properties, 201*A*.
  effect in steel, isothermal transformations, 211*A*.
  electrodeposition, 156*A*.
  electrodeposition, effect of organic compounds, 247*A*.
  properties at low temperatures, 253*A*.
  use in machine-tool industry, 100*A*.
NICKEL ALLOYS :
  corrosion in phosphoric acid, 57*A*.
  use in gas industry, 161*A*.
  use in mining industry, 161*A*.
NICKEL-CARBONYL POWDER, use in steel manufacture, 278*A*.
NICKEL-CLAD STEEL, manufacture and properties, 209*A*.
NICKEL COATINGS :
  effect on corrosion-fatigue, 56*A*.
  porosity, 156*A*.
  properties, 30*A*.
NICKEL STEEL :
  corrosion in nitrates, 57*A*.
  damping capacity, 186*P*.
  determination of iron, 109*A*.
  development, 82*A*.
  impact properties at low temperatures, 38*A*.
  properties, 161*A*., 208*A*.
  properties at low temperatures, 253*A*.
  structure, 48*A*.

use in hydrogenation plants, 162*A*.
use in oil industry, 161*A*.
welding, 293*A*.
NIESSNER'S SLAG-PRINT METHOD, 260*A*.
NIOBIUM:
determination in alloy steel, 313*A*.
determination in ferro-tantalum, ferro-niobium and ferro-tantalum-niobium, 111*A*.
determination in steel, 110*A*.
NI-TENSYL CAST IRON, production, 276*A*.
NITRALLOY, nitriding, 89*A*.
NITRATES, corrosion of steel, 57*A*.
NITRIDED CASES, hardness tests, sclero-grating method, 341 *Paper*.
NITRIDING:
austenitic steel, 90*A*.
crankshafts, distortion, 192*A*.
effect on fatigue strength, 252*A*.
high-speed steel, use of molten cyanides, 20*A*.
steel, during heating for quenching, 191*A*.
tool steel, 89*A*.
NITROGEN:
determination in iron-chromium alloys, 312*A*.
effect of dissociation on carbon monoxide, 71*A*.
solubility in iron-silicon alloys, 99*A*.
solubility in steel, 302*A*.
in steel, 208*A*.
in steel, effect on basic Bessemer linings, 11*A*.
NITROGEN OXIDES, occurrence during oxy-acetylene welding, 292*A*.
NORMALISING FURNACES, 186*A*.
NORTHAMPTONSHIRE, iron-ore mining, 64*A*.
NOVA SCOTIA, blast-furnace plant, 406*P*.
NUCLEATION, reaction kinetics, 103*A*.
NUCLEI, formation in metallic melts, 282*A*.

OFFICE TECHNIQUE POUR L'UTILISATION DE L'ACIER, corrosion tests, 53*A*.
OIL-ENGINE CASTINGS, manufacture, 180*A*.
OIL INDUSTRY, uses of nickel steel, 161*A*.
OIL REFINERIES, use of molybdenum steel, 208*A*.
OLIVINE, chemical behaviour during production of forsterite refractories, 1*A*.
OPEN-HEARTH FURNACES:
bottoms, life, 67*A*.
control, 12*A*., 133*A*.
design, 133*A*., 233*A*.
heating, 79*A*.
increase of efficiency, 278*A*.
refractory materials, 222*A*.
refractory materials, consumption, 66*A*.
roofs, design, 2*A*.
slag pockets, clearance, 184*A*.
use of blast-furnace gas and oxygen-enriched air, 278*A*.
use of carburetted coke-oven gas, 69*A*.
use of chrome-magnesite bricks, 66*A*.
use of pulverised coal, 3*A*.
valves, Blaw-Knox, 134*A*.
OPEN-HEARTH PRACTICE:
basic, 79*A*., 233*A*.
Magnitogorsk Works, 183*A*.
OPEN-HEARTH PROCESS:
basic, duration of boil, 80*A*.
basic, sulphur control, 135*A*.
boil, gases evolved, 280*A*.
desulphurisation of iron, 280*A*.
gas-slag-metal relation, 12*A*.
manganese loss, 80*A*.
oxygen content of steel, 134*A*.
slag control, 80*A*., 183*A*.
slag formation, 234*A*.
OPEN-HEARTH SLAGS:
basic, iron oxide concentration, 279*A*.
viscosity, 235*A*.
"OPTIMATIC" TEMPERATURE-RECORDING INSTRUMENTS, 287*A*.
ORDER-DISORDER TRANSFORMATION, theory, 115*P*.
ORES:
analysis, spectrum, 111*A*.
mining and treatment, 64*A*.
OXFORD AIREY TESTING MACHINE, 202*A*.
OXIDATION:
steel, determination of rate by interference colours, 20*A*.
steel, effect of carbon, 21*A*.
steel, effect of humidity of air, 59*A*.
OXIDE FILMS:
effect of scratch-line on protective character, 224*P*.
on metals, 266*A*.
on steel, 59*A*.
OXIDES:
iron, determination in sponge iron, 215*A*.
mineral, flotation, 65*A*.

OXIDES (*contd.*)—
nitrogen, occurrence during oxy-acetylene welding, 292*A*.
reactions with iron sulphide, 227*A*.
reduction at high temperatures, 126*A*.
OXYGEN :
in open-hearth steel, 134*A*.
in steel, 208*A*.
OXYGEN-ENRICHED AIR, use with blast-furnace gas in open-hearth furnaces, 278*A*.
OXYGEN/HYDROGEN/MOLTEN-IRON SYSTEM, 329 *Paper*.

PAINT COATINGS, protective value, 229*P*.
PAINTS :
adherence to galvanised iron, 249*A*.
protective, 35*A*.
PALESTINE, foundry plant, 277*A*.
PASSIVITY :
chromium, 267*A*.
stainless steel, 108*A*.
PATENTING, wire, 91*A*.
PATTERN-MAKING, 130*A*.
PEARLITE :
granular, production in strip by annealing, 91*A*.
spacing, effect on steel, 48*A*.
PERCHLORIC ACID, use in analysis, 109*A*.
PERMALLOY, magnetic properties, 299*A*.
PERMEAMETER, NBS High-*H*, 98*A*.
PETROL REFINERIES, corrosion problems, 57*A*.
PHOSPHATES, reactions with iron sulphide, 227*A*.
PHOSPHATISING, metals, 33*A*., 247*A*.
PHOSPHORIC ACID, manufacturing equipment, corrosion, 57*A*.
PHOSPHORUS :
determination in iron and steel, 312*A*.
determination in vanadium slag, 111*A*.
effect in cast iron, 101*A*.
effect in steel, 101*A*.
effect in steel, cutting properties, 201*A*.
PHOTOELASTICITY, stress measurement, 296*A*.
PHOTOMETER, Pulfrich, use for determining brightness of metals, 247*A*.
PICKLING :
chemistry, 28*A*.
effect on steel, fatigue strength, 39*A*.
PICKLING (*contd.*)—
electrolytic, 153*A*.
stainless steel, 304*A*.
strip, 28*A*.
use of inhibitors, 153*A*.
PICKLING BATHS, submerged heating, 153*A*.
PICKLING LIQUOR, recovery, 246*A*.
PICKLING TANKS, control, 28*A*.
PIG IRON :
casting machines, 178*A*.
decarburisation, R.K. process, 73*A*.
grading, recommendations of British Cast Iron Research Assoc., 8*A*.
manufacture in America, 405 *Paper*.
quality, effect of slag, 7*A*.
PIPE-CASTING PLANT, Staveley Coal and Iron Co., Ltd., 126*A*.
PIPE-LINES, welded, X-ray examination, 152*A*.
PIPES :
cast iron, bronze welding, 26*A*.
cast iron, design, 304*A*.
centrifugal casting, 10*A*., 126*A*.
corrosion in soil, 266*A*.
corrosion by stray currents, methods of protection, 58*A*.
hot-water, corrosion, 266*A*.
reheating furnaces, 85*A*., 186*A*.
PISTON RINGS :
internal stresses, 203*A*.
wear, 42*A*.
PISTON RODS, internal stresses, 38*A*.
PITCH, extraction, 225*A*.
PITCH COKE, production, 225*A*.
PITTSBURGH COAL CO., coal-cleaning plant, 3*A*.
PLASTICITY, theories, 203*A*.
PLATES :
boiler, caustic embrittlement, 167*A*.
boiler, welding, 292*A*.
cutting, preparation for welding, 201*A*., 292*A*.
reheating furnaces, 186*A*.
PLATING BATHS :
complex cations, 32*A*.
cyanide, measurement of hydrogen-ion concentration, 29*A*.
hydrogen-ion concentration indicators, 154*A*.
PLATINUM, hydrogen overvoltage, 55*A*.
POLAND, foundry industry, 277*A*.
POLAROGRAPH, use in analysis, 111*A*.
POLISHED STEEL, cleaning, 28*A*.
POLISHING :
electrolytic, 260*A*.
electrolytic, stainless steel, 246*A*.
stainless steel, 94*A*., 304*A*.

POLYMORPHISM, iron, effect of elements, 264*A*.
POROSITY, metallic coatings, 156*A*.
POROSITY TESTS, electrodeposited coatings, 31*A*.
POTASSIUM CARBONATE, reactions with iron sulphides, 228*A*.
POTASSIUM CHLORIDE, action on refractory materials, 119*A*.
POTENTIAL :
measurements, use and interpretation in corrosion, 54*A*.
rôle in corrosion, 54*A*.
POWDER, nickel-carbonyl, use in steel manufacture, 278*A*.
POWDER METALLURGY, applications, 229*A*.
POWDERED IRON, sintered, properties, 128*A*.
POWER, requirements for deep-drawing, 15*A*.
PRECIPITATION-HARDENING :
copper steel, 159*A*.
iron-molybdenum alloys, 41*A*.
iron-tungsten alloys, 41*A*.
PRESIDENT, induction of John Craig, 3*P*.
PRESIDENTIAL ADDRESS, John Craig, 53*P*.
PRESS TOOLS, fatigue, effect of surface condition, 204*A*.
PRESSES, welding, 150*A*.
PRESSING, tools for, 15*A*., 86*A*., 138*A*.
PRESSURE VESSELS, welding, 150*A*., 291*A*.
PRODUCER GAS :
use for heating coke ovens, 223*A*.
uses, 125*A*.
PRODUCERS :
tar yield, 125*A*.
use of coke breeze, 226*A*., 273*A*.
PRODUCTION RESEARCH, 12*A*.
PROPANE, use for cutting steel, 245*A*.
PROPELLER SHAFTS, heat treatment, 21*A*., 194*A*.
PROPELLERS, ship, moulding, 131*A*.
PROPERTIES, mechanical, relation to corrosion, 53*A*.
PULFRICH PHOTOMETER, use for determining brightness of metals, 247*A*.
PULVERISED COAL. *See* Coal Pulverised.
PYRITES, determination in coal, 314*A*.
PYROMETERS :
electric-resistance, 287*A*.
Fitterer, 81*A*.
optical, 143*A*., 287*A*., 288*A*.
PYROMETERS (*contd.*)
radiation, 287*A*.
Schofield, 81*A*.
suction, 287*A*.
PYROMETRY, 143*A*., 287*A*.

QUEENSLAND, iron ore deposits, 63*A*.
QUENCH AGEING, steel, 238*A*.
QUENCHED STEEL, cracks, 290*A*.
QUENCHING :
effect on hardness and structure, 23*A*.
large sections, 195*A*.
spring steel, effect of hot deformation, 195*A*.
stamping dies, 147*A*.
QUENCHING MEDIA :
cooling capacities, 243*A*.
relative merits, 23*A*.

RADIATION, furnace gases, 124*A*.
RAIL STEEL, effect of prolonged deformation, 98*A*.
RAILS :
defects, detection by electron defectoscope, 260*A*.
flakes, prevention, 39*A*.
thermit welding, 291*A*.
RAILWAY CONSTRUCTION, fatigue problems, 96*A*.
RAILWAY TRACKS, welding, 26*A*.
"RAMET," 94
"RAT-TAILING," on flat castings, 131*A*.
REACTION CHAMBERS, welding, 198*A*.
REACTIONS :
basic Bessemer process, 182*A*.
chemical, application of supersonics, 225*A*.
in cupolas, 77*A*., 129*A*.
electric arc welding, 148*A*.
solution-loss, blast-furnace process, 7*A*.
zinc and iron in galvanising, 157*A*.
RECRYSTALLISATION :
iron-copper-nickel alloys, 103*A*.
iron-nickel alloys, 307*A*.
RECUPERATORS :
Schack, 6*A*.
Tigerschiöld-Afzelius, 6*A*.
REDUCTION IN AREA, relation to elongation on fracture, 95*A*.
REFLECTIVITY, solar, determination, 2*A*.
REFRACTORY MATERIALS, 1*A*., 66*A*., 118*A*., 172*A*., 222*A*.
action of alkalies, 119*A*., 121*A*.
action of chlorine, 121*A*.

REFRACTORY MATERIALS (*contd.*)—
action of coal gas, 118*A*.
action of hydrochloric acid, 121*A*.
action of methane, 121*A*.
action of potassium chloride, 119*A*.
action of slag, 1*A*., 66*A*., 120*A*., 121*A*.
action of slag, relation to viscosity, 121*A*.
consumption in open-hearth furnaces, 66*A*.
for annealing furnaces, 222*A*.
for blast-furnaces, 222*A*.
for casting pits, 123*A*.
for electric furnaces, 222*A*.
for ladles, 222*A*.
for open-hearth furnaces, 222*A*.
for steel foundries, 222*A*.
iron oxide absorption tests, 66*A*.
load-tests at high temperatures, 1*A*.
tensile properties at high temperatures, 121*A*.
REFRACTORY MATERIALS (ALUMINA), properties, 222*A*.
REFRACTORY MATERIALS (BONDING MORTARS), properties, 123*A*.
REFRACTORY MATERIALS (CHROME), thermal-shock resistance, 122*A*.
REFRACTORY MATERIALS (CHROME MAGNESITE BRICKS):
thermal-shock resistance, 122*A*.
use in open-hearth furnaces, 66*A*.
REFRACTORY MATERIALS (FIREBRICKS), aluminium coating, 66*A*.
REFRACTORY MATERIALS (FIRECLAY), action of steam and sulphur dioxide, 118*A*.
REFRACTORY MATERIALS (FORSTERITE), chemical behaviour of olivine, 1*A*.
REFRACTORY MATERIALS (JOINTING CEMENTS), properties, 119*A*, 120*A*.
REFRACTORY MATERIALS (MAGNESITE BRICKS), manufacture, 66*A*.
REFRACTORY MATERIALS (SILICA), properties, 222*A*.
REFRACTORY MATERIALS (SILLIMANITE BRICKS), properties, 121*A*.
REFRACTORY MATERIALS (SILLIMANITE MIXES), behaviour on pressing, 120*A*.
REHBINDER'S MODIFICATION of Kusnezow hardness-testing machine, 299*A*.
REHEATING FURNACES:
for billets, 186*A*.
for pipes and tubes, 85*A*., 186*A*.
for plates, 186*A*.
for slabs, 186*A*.
See also Soaking Pits.
RENNERFELT-KALLING DIRECT PROCESS, 6*A*, 73*A*.
REPUBLIC STEEL CORPORATION:
blast-furnace plant, 227*A*.
tube mills, 141*A*., 189*A*.
RESEARCH:
corrosion, Belgium, 53*A*.
corrosion, Cambridge University, 219 *Paper*.
corrosion, England, 53*A*.
corrosion, France, 53*A*.
metallurgical, 164*A*.
RESIN, synthetic, use in steel industry, 17*A*.
RESISTANCE-TEMPERATURE CURVES, copper-gold alloys, 131*P*.
REUSS STRESS THEORY, 96*A*.
RIMMING STEEL:
annealing, 23*A*.
fatigue strength, 297*A*.
manufacture by duplex process, 281*A*.
solidification, 185*A*.
RIVETED JOINTS, fatigue strength, 252*A*.
R.K. PROCESS for decarburisation of pig iron, 6*A*, 73*A*.
RÖCHLING-RODENHAUSER ELECTRIC FURNACE, 82*A*.
ROCKWELL HARDNESS TESTS:
use of diamond-pyramid indenter, 299*A*.
wire, 205*A*.
ROLLAND AND SORIN APPARATUS for determination of modulus of elasticity, 295*A*.
ROLLERS, flame-hardening, 19*A*.
ROLLING:
cold, cooling of rolls, 88*A*.
cold, sections, 189*A*.
cold, stainless steel, 18*A*.
effect on steel, 286*A*.
flat wire, 87*A*.
liquid metal, 141*A*.
pressure on rolls, effect of external friction and tension, 87*A*.
pressures and spreading of materials, 140*A*.
stainless steel, 285*A*.
ROLLING-MILL EQUIPMENT, welding, 151*A*.
ROLLING-MILL PLANT:
American Rolling-Mill Co., 141*A*.

ROLLING-MILL PLANT (*contd.*)—
Carnegie Illinois Steel Corp., 18*A*., 141*A*.
Commonwealth Rolling Mills Proprietary, Ltd., 188*A*.
Darwins, Ltd., 18*A*.
Guest, Keen & Nettlefolds, Ltd., 17*A*.
Richard Thomas & Co., Ltd., 17*A*., 142*A*., 287*A*.
United Steel Companies, Ltd., 285*A*.
Warwick Rim and Sectioning Co., Ltd., 189*A*.
Whitehead Iron & Steel Co., Ltd., 17*A*., 88*A*., 189*A*.
Youngstown Sheet and Tube Co., 18*A*., 88*A*.
ROLLING-MILL PRACTICE, 17*A*., 87*A*., 140*A*., 188*A*., 240*A*., 285*A*.
ROLLING MILLS :
auxiliary equipment, 142*A*.
bar, 17*A*., 18*A*.
bearings, Lignostone, 141*A*.
bearings, permissible loads, 240*A*.
bearings, synthetic-resin, 87*A*., 140*A*., 188*A*.
cogging, 18*A*.
cogging, output capacity, 88*A*.
cold, 18*A*.
cold, backing rolls for, 88*A*.
cold, output capacity, 240*A*.
equipment, welding, 244*A*.
lubrication, 17*A*., 188*A*., 240*A*.
motors, Ignitron rectifier, 142*A*.
motors, safety devices, 142*A*.
section, 17*A*.
section, roll design, 140*A*.
sheet, 188*A*.
slab, energy consumption, 188*A*.
spindles and couplings, stresses, 158*A*.
stands, design, 188*A*.
statistics of operations, 285*A*.
strip, 17*A*., 18*A*., 88*A*., 189*A*.
strip, application of back-pull, Smith-Stringfellow process, 88*A*.
strip, electric driving, 142*A*.
strip, gauge control, 189*A*.
strip, temperature measurement, 287*A*.
strip, tension of material, 285*A*.
transport of material, 286*A*.
tube, Fretz Moon process, 141*A*., 189*A*.
ROLLING PROCESSES, classification, 285*A*.
ROLLS :
backing, for cold rolling mills, 88*A*.
carbide, use for mirror finish of strip, 286*A*.
cooling, 88*A*.
design, 140*A*.
forging, 86*A*., 237*A*.
turning, 87*A*.
worn, reconditioning, 189*A*.
ROOFS :
open-hearth furnaces, 2*A*.
sprung arch, for high temperature furnaces, 2*A*.
RUHR DISTRICT, long-distance gas supply, 176*A*.
RUNNERS for castings, 78*A*.
RUSSIA :
blast-furnace practice, 70*A*., 126*A*.
research on protective coatings, 154*A*.

SALINE :
corrosion of cast iron, effect of temperature, 54*A*.
corrosion of electrolytic iron, effect of temperature, 54*A*.
SALT BATHS :
"Carboneutral," 89*A*.
use in heat treatment, 89*A*.
SALT SOLUTIONS, corrosion of steel, 58*A*.
SALZGITTER HILLS, iron ore mining and preparation, 64*A*.
SCALE, removal from metals, 153*A*.
SCALING :
steel, 21*A*.
steel, effect of elements, 20*A*.
steel in sulphur dioxide, 166*A*.
SCHACK RECUPERATOR, 6*A*.
SCHOFIELD PYROMETER, 81*A*.
SCLERO-GRATING METHOD of hardness testing, 341 *Paper*.
SCRAP :
chromium steel, melting in electric furnaces, 281*A*.
uses and melting procedure, 233*A*.
SEA WATER, corrosion of steel, 58*A*.
SECTION MILLS, 17*A*.
roll design, 140*A*.
SECTIONS, cold rolling, 189*A*.
SEGREGATION :
carbide, in ingots, 84*A*.
in ingots, effect of anti-piping compounds, 263 *Paper*.
inverse, in ingots, 84*A*.
SEIZURE, steel and bronze, effect of lubricants, 285*A*.

SELENIUM, effect in steel, welding, 294*A*.
SHATTER CRACKS, in steel, prevention, 39*A*.
SHEAR TESTS, welds, 294*A*.
SHEET MILLS, 188*A*.
SHEETS :
automobile, spot welding, 149*A*.
coated, deep-drawing, 247*A*.
enamelling, 157*A*.
galvanised, corrosion products, 267*A*.
galvanised, welding, use of tin-coated electrodes, 92*A*., 150*A*.
straightening machines, 188*A*., 286*A*.
surface defects, 185*A*.
thin, hardness tests, 97*A*.
welded, cracks, 201*A*.
welding, burning during, 25*A*., 150*A*.
SHEFFIELD UNIVERSITY LABORATORY, swelling test, 174*A*.
SHELLS :
forging, 14*A*., 86*A*.
heat treatment, 21*A*.
SHEPHERD GRAIN-SIZE SCALE, compared with Jernkontoret scale, 48*A*.
SHEPHERD P-F TEST, 47*A*.
SHIPS, corrosion, 59*A*.
SHRINKAGE, castings, 181*A*.
SHRINKAGE STRESSES, in welded joints, 200*A*.
SIGMA PHASE, iron-chromium-manganese system, 52*A*.
SILESIA :
long-distance gas supply system, 69*A*.
mining industry, 221*A*.
SILICA :
determination in iron ore, 313*A*.
effect on blast-furnace slags, viscosity, 127*A*.
reduction, 73*A*.
SILICA REFRACTORIES. *See* Refractory Materials, 172*A*.
SILICATES, reactions with iron sulphide, 227*A*.
SILICON :
determination in cast iron, 214*A*.
determination in iron and steel, 312*A*.
effect in cast iron, 129*A*.
effect in steel, cutting properties, 201*A*.
SILICON STEEL :
deep-drawing tests, 239*A*.
development, 82*A*.
SILICON STEEL (*contd.*)—
electrical and magnetic properties, 300*A*.
SILICON STEEL CASTINGS, castability, 181*A*.
SILICON STEEL SHEETS, annealing, 242*A*.
SILLIMANITE. *See* Refractory Materials.
SILVER :
effect in steel, welding, 294*A*.
electrodeposition, 33*A*.
tarnishing, 233*P*.
SIMPLEX CENTRIFUGE, 223*A*.
SINTERED IRON, properties, 128*A*.
SINTERING PLANTS, heat balances, 65*A*.
SLAB MILLS, energy consumption, 188*A*.
SLABS, reheating furnaces, 186*A*.
SLAG :
action on refractory materials, 1*A*., 66*A*., 120*A*., 121*A*.
action on refractory materials, relation to viscosity, 121*A*.
basic Bessemer, recovery of vanadium, 82*A*.
basic open-hearth, iron oxide concentration, 279*A*.
blast-furnace. *See* Blast-Furnace Slag.
constitution and melting points, 12*A*.
control, open-hearth process, 80*A*., 183*A*.
formation in open-hearth process, 234*A*.
iron-oxide equilibrium, 12*A*.
open-hearth, viscosity, 235*A*.
soda ash, granulation, 73*A*.
soda-ash, recovery of iron, 72*A*., 73*A*.
thermomagnetic behaviour, 206*A*.
vanadium, determination of phosphorus, 111*A*.
SLAG-PRINT METHOD for detecting inclusions, 260*A*.
SLAGGING TESTS, refractory materials, furnace for, 1*A*.
SLIP-CASTING, crucibles, 1*A*.
SMELTING, low-grade ore, 71*A*.
SMITH-STRINGFELLOW PROCESS, for applying back-pull in strip mills, 88*A*.
SOAKING PITS :
circular, 85*A*., 186*A*.
throughput capacity, 186*A*.
See also Reheating Furnaces.
SOCIÉTÉ ANON. DES CHARBONNAGES DE LA LOUVIÈRE, coal-cleaning plant, 272*A*.

SODA-ASH SLAG :
granulation, 73*A*.
recovery of iron, 72*A*., 73*A*.
SODIUM CARBONATE :
action on refractory materials, 119*A*.
reactions with iron sulphide, 228*A*.
SODIUM HYDROXIDE, action on refractory materials, 119*A*.
SOIL :
corrosion of metals, 167*A*.
corrosion of pipes, 266*A*.
SOLAR REFLECTIVITY, determination, 2*A*.
SOLDERING, stainless steel, 304*A*.
SOLIDIFICATION :
castings, 10*A*.
chromium-nickel steel ingots, 83*A*., 185*A*.
ingots, 13*A*., 235*A*.
ingots, effect of wall-thickness of moulds, 83*A*.
rimming steel, 185*A*.
SOUTH AFRICA, iron industry, 128*A*.
SOUTH AFRICAN COAL, rational analysis, 272*A*.
SOUTH AFRICAN IRON & STEEL CORP., plant, 128*A*.
SPAIN, iron-ore deposits, 221*A*.
SPARK TESTS, 97*A*.
SPATHIC ORE, roasted, magnetic properties, 65*A*.
SPECIFIC HEAT :
iron carbide, 207*A*.
iron-nickel alloys, 300*A*.
measurement, 42*A*.
SPECIFIC HEAT/TEMPERATURE CURVES :
alloys, 122*P*.
aluminium-copper alloys, 140*P*.
copper-silver alloys, 139*P*.
SPECIFICATIONS :
cast iron, French, 163*A*.
foamed blast-furnace slag for concrete aggregate, British, 72*A*.
tar for tar-macadam, German, 72*A*.
tubes, British, 209*A*.
welded structures, French, 27*A*.
welding of boilers, American, 27*A*., 150*A*.
wire rope, British, 209*A*.
SPECTROGRAPHS, design, 215*A*.
SPECTRUM ANALYSIS, 313*A*.
cast iron, 109*A*.
determination of niobium and tantalum in steel, 110*A*.
ores, 111*A*.
SPHEROIDISATION, steel, 52*A*.
SPONGE IRON :
determination of iron oxide, 215*A*.
manufacture, 74*A*.
SPRAYING :
chromium steel, 35*A*.
metals, 248*A*.
zinc, 34*A*.
SPRING STEEL :
grain-size determination, 263*A*.
quenching, effect of hot deformation, 195*A*.
SPRINGS :
fatigue cracks, 96*A*.
fatigue strength, effect of surface condition, 298*A*.
STAINLESS STEEL :
brazing, 93*A*.
cold rolling, 18*A*.
corrosion tests, 56*A*.
deep-drawing, 304*A*.
development in Germany, 303*A*.
electrolytic polishing, 246*A*.
heat treatment, 289*A*.
passivity, 108*A*.
pickling, 304*A*.
polishing, 94*A*., 304*A*.
properties, 304*A*.
rolling, 285*A*.
soldering, 304*A*.
spot welding, 149*A*.
use in aircraft construction, 257*A*.
welding, 292*A*., 304*A*.
STAINLESS STEEL WIRE, drawing, 139*A*.
STAMPING DIES, quenching, 147*A*.
STAMPING TOOLS, design and construction, 187*A*.
STANDARDISATION :
corrosion tests in Germany, 53*A*.
steel, 102*A*.
STASSANO ELECTRIC FURNACE, 82*A*.
STATISTICS, rolling-mill operations, 285*A*.
STAVELEY COAL AND IRON CO., LTD., plant, 126*A*.
STEAM :
action on fireclay, 118*A*.
effect on dissociation of carbon monoxide, 71*A*.
STEAM-RAISING PLANTS, test code, 124*A*.
STEEL :
acid-resistant, manufacture, 135*A*.
alloy, analysis, 214*A*.
alloy, creep, 42*A*.
alloy, developments in Germany, 46*A*., 135*A*.
alloy, elongation on fracture, 95*A*.
alloy, hardness tests, end-quench, 40*A*.

STEEL (*contd.*)—
alloy, properties at low temperatures, 253*A*.
alloy, welding, 148*A*.
austenitic, detection of ferrite by magnetic means, 207*A*.
austenitic, nitriding, 90*A*.
austenitic, tensile properties, effect of work-hardening capacity, 296*A*.
austenitic, tensile tests, time factor, 158*A*.
axle, grain-size determination, 263*A*.
ball-bearing, annealing, effect of original structure, 192*A*.
cast, properties, 163*A*.
castability, 231*A*.
castings, *see* Castings.
clad, manufacture and properties, 209*A*.
clad, welding, 199*A*.
cold-work sensitivity, 47*A*.
cold-working, 238*A*.
composite, manufacture, Plurameltprocess, 282*A*.
corrosion, effect of grain size, 310*A*.
corrosion, effect of inclusions, 55*A*.
corrosion in alkalis, 107*A*.
corrosion in nitrates, 57*A*.
corrosion in salt solutions, 58*A*.
corrosion in sea water, 58*A*.
corrosion, intercrystalline, 55*A*.
corrosion-fatigue, effect of metallic coatings, 56*A*.
creep, 301*A*.
cutting, effect of elements, 201*A*.
cutting, use of butane, propane and acetylene, 245*A*.
damping capacity, Föppl-Pertz machine, 160*P*.
damping capacity, measurement, 157 *Paper*.
decarburisation, effect of elements, 20*A*.
deoxidation, 81*A*.
deoxidation, aluminium used, 136*A*.
die, annealing, effect of original structure, 192*A*.
diffusion of hydrogen, 259*P*.
dissolution in sulphuric acid, 54*A*.
drill, heat treatment, 22*A*.
dynamo, annealing, 242*A*.
effect of copper, 102*A*., 304*A*.
effect of grain size, 48*A*.
effect of hydrogen, 255*A*.
effect of manganese, 258*A*.
effect of phosphorus, 101*A*.
effect of titanium, 45*A*.
STEEL (*contd.*)—
fatigue, detection by etching, 205*A*.
fatigue strength, effect of pickling, 39*A*.
flakes, prevention, 39*A*.
flow through ladle nozzles, 185*A*.
forged, machinability, effect of carbon, 202*A*.
free-cutting, welding, 291*A*.
gases in, 208*A*.
grain-growth, effect of aluminium, vanadium and titanium, 104*A*.
grain-size, 165*A*.
grain-size, bibliography, 48*A*.
grain-size, McQuaid-Ehn test, 47*A*.
grain-size, Shepherd P-F test, 47*A*.
grooving by flame cutting, 27*A*.
hardness, effect of quenching methods, 23*A*.
heat-resistant, manufacture, 182*A*.
heat-resistant, properties, 207*A*.
heat-resistant, welding, 244*A*.
heat-treated, properties, effect of hardness and temperature, 41*A*.
hot-working properties, 102*A*.
killed, annealing, 23*A*.
killed, fatigue strength, 297*A*.
lead-bearing, properties, 94*A*., 202*A*.
liquid, hydrogen content, 258*P*.
liquid, rolling, 141*A*.
liquid, temperature measurement, 288*A*.
machinability, 94*A*.
magnet, heat treatment, 145*A*.
nitriding during heating for quenching, 191*A*.
oxidation, determination of rate by interference colours, 20*A*.
oxidation, effect of carbon, 21*A*.
oxidation, effect of humidity of air, 59*A*.
oxide films, 59*A*.
oxygen-content, in open-hearth process, 134*A*.
polished, pickling, 28*A*.
polishing, electrolytic, 260*A*.
production, 11*A*., 79*A*., 133*A*., 182*A*., 233*A*., 278*A*.
production, behaviour of hydrogen, 233*A*.
production, gas evolution, 280*A*.
production in high-frequency furnaces, slag manipulation, 235*A*.
production in Sweden, 11*A*.
production, manganese equilibria, 279*A*.

STEEL (*contd.*)—
production, use of nickel-carbonyl powder, 278*A*.
properties at high temperatures, 43*A*., 99*A*.
properties, calculation from composition, 163*A*.
properties, effect of pearlite spacing, 48*A*.
properties, effect of rolling conditions, 286*A*.
quench ageing, 238*A*.
quenched, cracks, 290*A*.
rail, effect of prolonged deformation, 98*A*.
rimming, annealing, 23*A*.
rimming, fatigue strength, 297*A*.
rimming, manufacture by duplex process, 281*A*.
scaling, 21*A*.
scaling, effect of elements, 20*A*.
scaling in sulphur dioxide, 166*A*.
semi-killed, fatigue strength, 297*A*.
shatter cracks, prevention, 39*A*.
solubility of nitrogen, 302*A*.
solution of carbides, 49*A*.
sorting, magnetic method, 300*A*.
spheroidisation, 52*A*.
spring, grain size determination, 263*A*.
spring, quenching, effect of hot deformation, 195*A*.
standardisation, 102*A*.
strain ageing, 238*A*.
structure, effect of quenching methods, 23*A*.
sulphide inclusions, effect of clay packing used in carburisation, 190*A*.
tempered, hardness, 40*A*.
time-elongation curves, 99*A*.
torsional fatigue strength, effect of stress range, 158*A*.
transformations, austenite, 50*A*., 51*A*.
transformations, isothermal, 212*A*.
transformations, isothermal, effect of elements, 211*A*.
transformer, annealing, 242*A*.
transformer, decarburisation on annealing in hydrogen, 144*A*.
tyre, structure, 262*A*.
weldability, 151*A*.
welding, effect of carbon, 26*A*.
welding, effect of carbon, bibliography, 26*A*.
welding, effect of elements, 294*A*.
welding, hardness produced, 151*A*.
yield point, 37*A*., 250*A*.

STEEL COMPANY OF CANADA, LTD., control system for open-hearth plant, 12*A*.
STEEL FOUNDRIES, refractory materials, 222*A*.
STEEL PLANTS :
Continental Steel Corporation, 278*A*.
Guest, Keen, Baldwins Iron & Steel Co., Ltd., 11*A*.
Guest, Keen and Nettlefolds, Ltd., 11*A*.
Hall and Pickles, Ltd., 11*A*.
James Mills, Ltd., 278*A*.
methods of increasing capacity, 133*A*., 282*A*.
Stewarts and Lloyds, Ltd., 11*A*.
Richard Thomas & Co., Ltd., 6*A*., 11*A*.
Whitehead Iron and Steel Co., Ltd., 11*A*.
STEWARTS AND LLOYDS, LTD. :
coking plant, 4*A*., 174*A*.
steel plant, 11*A*.
STRAIGHTENING MACHINES, sheets, 188*A*., 286*A*.
STRAIN AGEING, steel. 238*A*.
STRAIN ANNEALING, 192*A*.
STRESS :
calculated nominal, effect of cracks on, of specimen subjected to constant bending moment, 250*A*.
effect on magnetic properties, 98*A*.
measurement by photo-elasticity, 296*A*.
measurement, X-ray method, 95*A*., 210*A*., 296*A*., 297*A*.
range, effect on torsional fatigue strength, 158*A*.
STRESS-CORROSION CRACKING, chromium-nickel steel, 56*A*.
STRESS-STRAIN CURVE, determination, 295*A*.
STRESS-STRAIN DIAGRAM, relation to elastic behaviour of testing machine, 37*A*.
STRESSES :
internal, in cast iron, 203*A*.
internal, in piston rods, 38*A*.
in rolling-mill spindles and couplings, 158*A*.
shrinkage, in welded joints, 200*A*.
STRIP :
annealing, for production of granular pearlite, 91*A*.
bright annealing, 22*A*.
coilers for, 240*A*.
electro-tinning, 248*A*.
heat-treatment furnaces, 147*A*.

STRIP (*contd.*)—
mirror-finish, use of carbide rolls, 286*A*.
pickling, 28*A*.
thickness measurement, 240*A*.
welding, 149*A*.
STRIP MILLS, 17*A*., 18*A*., 88*A*., 189*A*.
application of back-pull, Smith-Stringfellow process, 88*A*.
electric driving, 142*A*.
gauge control, 189*A*.
temperature measurement, 287*A*.
tension of material, 285*A*.
STRONTIUM CARBONATE, reactions with iron sulphides, 228*A*.
STRONTIUM OXIDE, reactions with iron sulphide, 228*A*.
STRUCTURAL STEEL :
deformation resistance, 138*A*.
effect of copper, 100*A*.
fatigue, 205*A*.
high-tensile low-alloy, welding, 92*A*.
welding, 292*A*., 293*A*.
STRUCTURE :
alloys, 63 *Paper*, 306*A*.
ancient iron, 264*A*.
cementite, 144*P*.
effect of diffusion in metals, 48*A*.
nickel steel, 48*A*.
steel, effect of quenching methods, 23*A*.
tyre steel, 262*A*.
welded joints, effect of preheating, 200*A*.
welds, effect of cooling rate, 245*A*.
STUMP COAL-CLEANING PLANT, 3*A*.
SULPHIDE INCLUSIONS, in steel, effect of clay packing used in carburisation, 190*A*.
SULPHUR :
control in basic open-hearth process, 135*A*.
determination in coal and coke, 314*A*.
determination in iron and steel, evolution method, 109*A*.
effect in coal, combustion, 124*A*.
recovery from coke-oven gas, 5*A*.
SULPHUR DIOXIDE :
action on fireclay, 118*A*.
scaling of steel, 166*A*.
SULPHURIC ACID, dissolution of steel, 54*A*.
SUPERHEATER TUBES, corrosion, 58*A*.
SUPERSONICS, application to chemical reactions, 225*A*.
SURFACE CONDITION :
effect on fatigue of press tools, 204*A*.
effect on fatigue strength of springs, 298*A*.
SURFACE PRESSING, for increase of fatigue strength, 297*A*.
SURFACES :
smooth, production, 94*A*.
hard, 26*A*., 190*A*.
SWEDEN :
blast-furnace practice, 6*A*.
flotation of iron ore, 65*A*.
manufacture of steel, 11*A*.
mining industry, 64*A*.
proposed blast-furnaces in Norrland, 126*A*., 177*A*.
SWELLING, coal, 4*A*., 5*A*., 174*A*.
SWELLING TESTS :
coal, Baum-Heuser, 174*A*.
coal, Koppers, 174*A*.
coal, Nedelmann, 174*A*.
coal, Sheffield University Laboratory, 174*A*.
coal, United States Bureau of Mines, 174*A*.

TANTALUM :
determination in ferro-tantalum, ferro-niobium, and ferro-tantalum-niobium, 111*A*.
determination in steel, 110*A*.
TAR :
German specifications for tar-macadam, 72*A*.
yield from gas producers, 125*A*.
TARNISHING, silver, 233*P*.
TATA IRON AND STEEL CO., blast-furnace plant, 455*P*.
TEMPERATURES :
changes during welding, 294*A*.
control, electroplating, 155*A*.
control in furnaces, 143*A*.
distribution in steel spheres, 186*A*.
effect on cast iron, corrosion in saline, 54*A*.
effect on electrolytic iron, corrosion in saline, 54*A*.
effect on heat-treated steel, 41*A*.
flame, coke ovens, 224*A*.
forging, 187*A*.
high, brittleness of chromium-molybdenum-nickel steel, 300*A*.
high, load tests of refractory materials, 1*A*.
high, properties of copper, 43*A*.
high, properties of steel, 43*A*., 99*A*.

TEMPERATURES (*contd.*)—
high, tensile properties of refractory materials, 121*A*.
low, impact properties of nickel steel, 38*A*.
low, properties of alloy steel, 253*A*.
low, properties of chromium-molybdenum steel, 253*A*.
low, properties of chromium-nickel steel, 253*A*.
low, properties of electrolytic copper, 253*A*.
low, properties of lead, 253*A*.
low, properties of nickel, 253*A*.
low, properties of nickel steel, 253*A*.
low, properties of pure iron, 253*A*.
measurement, 143*A*.
measurement at strip mills, 287*A*.
measurement in furnaces, 287*A*.
measurement of liquid steel, 288*A*.
TEMPERED STEEL, hardness, 40*A*.
TEMPERING :
high-speed steel, 24*A*.
welded joints, 200*A*.
TENNESSEE COAL, IRON AND RAILROAD CO., history of development, 6*A*.
TENSILE PROPERTIES :
austenitic steel, effect of work-hardening capacity, 296*A*.
chromium-nickel steel, effect of previous deformation, 37*A*.
refractory materials at high temperatures, 121*A*.
TENSILE STRENGTH, relation to fatigue strength, 252*A*.
TENSILE TESTS :
austenitic steel, time factor, 158*A*.
bend, 203*A*.
relation between elongation on fracture and reduction of area, 95*A*.
test-bars, 250*A*.
TEST-BARS, for tensile tests, 250*A*.
TESTING MACHINES :
bend, for small specimens, 103*A*.
creep, 99*A*
elastic behaviour, relation to stress-strain diagram, 37*A*.
fatigue, 158*A*.
fatigue, for locomotive frames, 96*A*.
hardness, Herbert Cloudburst, 299*A*.
hardness, Herbert pendulum, 299*A*.
hardness, Kusnezow pendulum, Rehbinder's modification, 299*A*.
TESTING MACHINES (*contd.*)—
hardness, Lips, 299*A*.
machinability, Oxford-Airey, 202*A*.
TESTS :
bend fatigue, 252*A*.
bend tensile, 203*A*.
bend, weld metal, 244*A*.
bonding clay, 180*A*.
coking, coal, 224*A*., 272*A*.
corrosion, atmospheric, long-time, 54*A*.
corrosion, chromium-nickel steel, Huey method, 56*A*.
corrosion, combined mist and rain chamber, 310*A*.
corrosion, salt spray, 56*A*.
corrosion, stainless steel, 56*A*.
corrosion, standardisation in Germany, 53*A*.
corrosion-fatigue, short-time, 252*A*.
creep, short duration, 43*A*.
creep, short-time, 99*A*.
deep-drawing, 15*A*., 187*A*., 237*A*., 238*A*.
deep-drawing, Erichsen, 239*A*.
enamels, 157*A*.
endurance, welded joints, 152*A*.
fatigue, 251*A*.
fatigue, wire, 96*A*.
hardness, end-quench, alloy steel, 40*A*.
hardness, Rockwell, use of diamond-pyramid indenter, 299*A*.
hardness, Rockwell, wire, 205*A*.
hardness, sclero-grating method, 341 *Paper*.
hardness, thin sheets, 97*A*.
iron-oxide absorption, refractory materials, 66*A*.
load, refractory materials at high-temperatures, 1*A*.
McQuaid-Ehn, 47*A*.
magnetic, 103*A*., 160*A*., 210*A*., 261*A*., 305*A*.
magnetic, NBS High-*H* Permeameter, 98*A*.
moulding sand, 276*A*.
porosity, electrodeposited coatings, 31*A*.
shear, welds, 294*A*.
Shepherd, P-F, 47*A*.
slagging, refractory materials, furnace for, 1*A*.
spark, 97*A*.
swelling, coal, Baum-Heuser, 174*A*.
swelling, coal, Koppers, 174*A*.
swelling, coal, Nedelmann, 174*A*.
swelling, coal, Sheffield University Laboratory, 174*A*.

TESTS (*contd.*)—
swelling, coal, United States Bureau of Mines, 174*A*.
tensile, austenitic steel, time factor, 158*A*.
tensile, relation between elongation on fracture and reduction of area, 95*A*.
tensile, test-bars, 250*A*.
torsion-fatigue, crankshafts, 252*A*.
torsion-impact, stress-strain characteristics, 37*A*.
welded parts, 244*A*.
welds, 152*A*., 197*A*.
zinc-coated wire, British specification, 248*A*.
THERMAL CONDUCTIVITY :
determination, 2*A*.
metals, 207*A*.
THERMIT WELDING, 291*A*.
rails, 291*A*.
THERMOCOUPLES, 287*A*.
extended-surface, 287*A*.
iridium-platinum/platinum, 143*A*.
palladium-gold/rhodium-platinum, 143*A*.
rhodium-platinum/platinum, 143*A*.
THERMODYNAMIC PROPERTIES, iron carbide, 207*A*.
THERMOMAGNETIC BEHAVIOUR, slags, 206*A*.
THOLANDER BLAST-FURNACE STOVE, 6*A*.
THOMAS, RICHARD, AND CO., LTD. :
boiler plant, 124*A*.
manufacture of electrolytic iron, 179*A*.
plant, 6*A*.
rolling-mill plant, 17*A*., 142*A*., 287*A*.
steel plant, 11*A*.
TIGERSCHIÖLD-AFZELIUS RECUPERATOR, 6*A*.
TIME-ELONGATION CURVES, steel, 99*A*.
TIME-POTENTIAL CURVES, use for assessing corrosion-resistance of steel, 107*A*.
TIN :
effect in steel, welding, 294*A*.
electrodeposition, 35*A*.
electrodeposition on strip, 248*A*.
TINPLATE, corrosion, 232*P*., 57*A*.
TITANIA, effect on blast-furnace slag, viscosity, 127*A*.
TITANIC ACID, reduction, 178*A*.
TITANIFEROUS IRON ORE, behaviour in blast-furnace, 71*A*.
TITANIUM :
addition to cast iron with calcium silicide, 43*A*.
TITANIUM (*contd.*)—
determination in alloy steel, 313*A*.
determination in steel, 110*A*.
effect in cast iron, 208*A*.
effect in steel, 45*A*.
effect in steel, grain growth, 104*A*.
effect in steel, welding, 294*A*.
uses in metallurgy, 302*A*.
TITANIUM CONCENTRATE, use in melting alloy steel, 137*A*.
TITANIUM DIOXIDE, reduction, 71*A*.
TOMBAC-COATED SHEETS, deep-drawing, 247*A*.
TOOL STEEL :
annealing, 146*A*.
hardenability, effect of elements and heat treatment, 41*A*.
nitriding, 89*A*.
properties, 162*A*.
TOOLS, heat treatment, 22*A*.
TORSION FATIGUE STRENGTH :
fillet welds, 93*A*.
steel, effect of stress range, 158*A*.
TORSION FATIGUE TESTS, crankshafts, 252*A*.
TORSION IMPACT TESTS, stress-strain characteristics, 37*A*.
TRACTOR PARTS, production, 276*A*.
TRANSFORMATIONS :
alpha-gamma, 308*A*.
austenite, 50*A*., 51*A*.
brass, 127*P*.
chromium-nickel steel, cold-worked, 105*A*.
isothermal, 307*A*.
isothermal, in steel, 212*A*.
isothermal, in steel, effect of elements, 211*A*.
manganese steel, 264*A*.
order-disorder, theory, 115*P*.
TRANSFORMER STEEL :
annealing, 242*A*.
decarburisation on annealing in hydrogen, 144*A*.
TRANSPORT, material in rolling mills, 286*A*.
TROMP COAL CLEANING PROCESS, 173*A*., 272*A*.
TROPENAS CONVERTERS, electric, 137*A*.
TUBE MILLS, Fretz-Moon process, 141*A*., 189*A*.
TUBE PLANT, Newport and South Wales Tube Co., Ltd., 18*A*.
TUBES :
asbestos-cement coatings, 35*A*.
boiler, corrosion, 58*A*.
boiler, failure, 160*A*.
chromium-molybdenum steel, welding, 199*A*.

TUBES (*contd.*)—
rectangular, production, 189*A*.
reheating furnaces, 85*A*., 186*A*.
resistance welding, jig for, 198*A*.
specification, British, 209*A*.
superheater, corrosion, 58*A*.
TUNGSTEN :
addition to cast iron with calcium silicide, 43*A*.
determination in iron and steel, 215*A*.
effect in steel, cutting properties, 201*A*.
effect in tool steel, hardenability, 41*A*.
TUNGSTEN MAGNET STEEL, heat treatment, 145*A*.
TUNGSTEN STEEL :
determination of iron, 109*A*.
development, 82*A*.
welding, 199*A*.
welding, bibliography, 199*A*.
TURBINE ROTORS, forging, 283*A*.
TURBINES, combustion, 176*A*.
TURBO-BLOWERS for long distance gas-supply systems, 226*A*.
TURNING, cast iron, 202*A*.
TUYERES, blast-furnace, design, 178*A*.
TYRE STEEL, structure, 262*A*.
TYRES, failure, 251*A*.
TYSLAND-HOLE ELECTRIC FURNACE, 6*A*.

UNITED KINGDOM :
coking industry, 272*A*.
corrosion research, 53*A*.
electroplating practice, 29*A*.
fuel efficiency in iron industry, 175*A*.
iron-ore deposits, 221*A*.
mining iron ore, 64*A*.
specification for foamed blast-furnace slag for concrete aggregate, 72*A*.
specification for tests on zinc coatings, 248*A*.
specification for tubes, 209*A*.
specification for wire rope, 209*A*.
UNITED STATES :
blast-furnace capacities, 429*P*.
blast-furnace dimensions, 428*P*., 441*P*.
blast-furnace practice, 405 *Paper*.
coal deposits, 420*P*.
costs of transporting raw materials for blast-furnaces, 426*P*.
galvanising practice, 35*A*.
handling of raw materials at blast-furnaces, 429*P*.
UNITED STATES (*cont.*)—
iron ore composition, 412*P*.
iron ore deposits, 408*P*.
iron ore production, imports and exports, 411*P*.
iron ore reserves, 410*P*.
specifications for welded boilers, 27*A*., 150*A*.
UNITED STATES BUREAU OF MINES, swelling test, 174*A*.
UNITED STEEL COMPANIES, LTD., rolling-mill plant, 285*A*.
UPSETTING PRACTICE, 187*A*.

VAN DER HORST METHOD of chromium-hardening, 206*A*.
VANADIUM :
determination in iron and steel, 215*A*.
effect in cast iron, 303*A*.
effect in chromium-nickel steel, grain disintegration, 211*A*.
effect in chromium steel, 46*A*.
effect in high-speed steel, cutting properties, 100*A*.
effect in steel, cutting properties, 201*A*.
effect in steel, grain growth, 104*A*.
effect in steel, isothermal transformations, 211*A*.
effect in tool steel, hardenability, 41*A*.
recovery from basic Bessemer slags, 82*A*.
VANADIUM SLAG, determination of phosphorus, 111*A*.
VANADIUM STEEL :
carbides, 309*A*.
determination of iron, 109*A*.
effect of cooling rate, 212*A*.
VALVE SEATS, use of chromium-cobalt-tungsten alloy, 198*A*.
VALVE TAPPETS, hardening, 243*A*.
VALVES :
Blaw-Knox, 134*A*.
welding, 198*A*.
VISCOSITY :
blast-furnace slag, effect of elements, 127*A*.
metals, 131*A*.
open-hearth slags, 235*A*.
slags, relation to attack on refractories, 121*A*.
VOGEFA METHOD for testing skill of operators, 291*A*.
VOIGT'S STRESS THEORY, 96*A*.

WARWICK RIM & SECTIONING CO., LTD., rolling-mill plant, 189*A*.

WASH OILS, determination of benzol, 314*A*.
WATER, corrosion of metals, 166*A*.
WATER VAPOUR, effect of dissociation on carbon monoxide, 71*A*.
WEAR:
  automobile engine cylinders, 206*A*.
  cast iron, 252*A*.
  cylinders and piston rings, 42*A*.
  metals, in rolling and sliding friction, 159*A*.
WELD METAL:
  bend tests, 244*A*.
  fatigue strength, 294*A*.
  properties, 294*A*.
WELDABILITY, steel, 151*A*.
WELDED AUTOMOBILE FRAMES, design, 93*A*.
WELDED BOILER PLATE, heat treatment, 199*A*.
WELDED JOINTS:
  endurance tests, 152*A*.
  fatigue strength, 93*A*., 252*A*.
  grain refinement, 200*A*.
  impact values, 27*A*.
  shrinkage stresses, 200*A*.
  structure and hardness, effect of preheating, 200*A*.
WELDED PARTS, tests, 244*A*.
WELDED PIPE LINES, X-ray examination, 152*A*.
WELDED SHEETS, cracks, 201*A*.
WELDED STRUCTURES, specifications, French, 27*A*.
WELDING:
  alloy steel, 148*A*.
  atomic hydrogen, 244*A*.
  boiler plates, 292*A*.
  boilers, 150*A*.
  boilers, specification, American, 27*A*., 150*A*.
  bronze-, cast iron, 26*A*.
  castings, 199*A*.
  chromium-copper steel, 292*A*.
  chromium-molybdenum steel tubes, 199*A*.
  chromium-nickel steel, 25*A*.
  chromium-phosphorus steel, 293*A*.
  clad steel, 199*A*.
  codes and specifications, 27*A*., 150*A*.
  copper-manganese steel, 293*A*.
  copper steel, 26*A*., 292*A*.
  copper steel, bibliography, 26*A*.
  electric arc, reactions, 148*A*.
  electric resistance, tubes, jig for, 198*A*.
  free-cutting steel, 291*A*.
  fundamental nature, 25*A*.
WEILDING (*contd.*)—
  galvanised sheets, use of tin-coated electrodes, 92*A*., 150*A*.
  heat effects, 148*A*.
  heat-resistant steel, 244*A*.
  high-tensile low-alloy structural steel, 92*A*.
  locomotives, 26*A*., 150*A*.
  manganese steel, 292*A*.
  molybdenum steel, 293*A*.
  nickel steel, 293*A*.
  oxy-acetylene, occurrence of nitrogen oxides, carbon monoxide and carbon dioxide, 292*A*.
  preheating of metals, 25*A*.
  preparation of plates by cutting, 201*A*., 292*A*.
  presses, 150*A*.
  pressure vessels, 150*A*., 291*A*.
  railway tracks, 26*A*.
  reaction chambers, 198*A*.
  rolling-mill equipment, 151*A*., 244*A*.
  sheets, burning during, 25*A*., 150*A*.
  spot, automobile sheets, 149*A*.
  spot, carbon steel, 149*A*.
  spot, stainless steel, 149*A*.
  stainless steel, 292*A*., 304*A*.
  steel, effect of carbon, 26*A*.
  steel, effect of carbon, bibliography, 26*A*.
  steel, effect of elements, 294*A*.
  steel, hardness produced, 151*A*.
  steel castings, 151*A*.
  strip, 149*A*.
  structural steel, 292*A*., 293*A*.
  temperature changes, 294*A*.
  testing skill of operators, 291*A*.
  thermit, 291*A*.
  thermit, rails, 291*A*
  tungsten steel, 199*A*.
  tungsten steel, bibliography, 199*A*.
  valves, 198*A*.
WELDING ELECTRODES:
  behaviour of mild steel wire, 197*A*.
  characteristics, 291*A*.
  effect of manganese, 198*A*.
  efficiency, 148*A*.
  manufacture, 291*A*.
  relation to weld metal, 148*A*.
  tin-coated, 92*A*., 150*A*.
WELDING MACHINES:
  electric, 25*A*.
  spot, 92*A*., 291*A*.
  welding characteristics, 92*A*.
WELDING RODS, types, 92*A*.
WELDS:
  corrosion, 57*A*.
  cracking, 292*A*.
  fillet, fatigue strength, 200*A*.

WELDS (*contd.*)—
fillet, torsional fatigue strength, 93*A*.
shear tests, 294*A*.
structure and hardness, effect of cooling rate, 245*A*.
tests, 152*A*., 197*A*.
WENDELL CENTRIFUGE, 223*A*.
WHEELS, car, properties, 45*A*.
WHITEHEAD IRON AND STEEL CO., LTD.:
rolling-mill plant, 17*A*., 88*A*., 189*A*.
steel plant, 11*A*.
WICKWIRE SPENCER STEEL CO., wire-drawing plant, 138*A*., 187*A*., 284*A*.
WILLIAMS PRIZE:
awarded to W. B. Lawrie, 7*P*.
awarded to W. T. Wilson, 7*P*.
"WIMET," 94*A*.
WIRE:
aluminium coating, 33*A*.
annealing furnaces, 289*A*.
cold-heading, 284*A*.
drawing, 138*A*., 187*A*., 284*A*.
fatigue strength, effect of rest period, 251*A*.
fatigue tests, 96*A*.
flat, rolling, 87*A*.
heat treatment by electric current, 194*A*.
heat-treatment furnaces, 91*A*., 147*A*.
patenting, 91*A*.
Rockwell hardness tests, 205*A*.
stainless steel, drawing, 139*A*.
zinc-coated, tests. British specification, 248*A*.
WIRE-DRAWING MACHINES, 86*A*.
Barcro, 187*A*.
Crossley, 16*A*.
WIRE RODS, cold-drawing, 284*A*.
WIRE ROPES:
load-carrying capacity, 163*A*., 259*A*.
manufacture, 16*A*.
specification, British, 209*A*.
WITHERITE, use in case-hardening, 241*A*.
WOODWARD IRON CO., dry-air blast plant, 126*A*.
WORK-HARDENING CAPACITY, austenitic steel, effect on tensile properties, 296*A*.
WORKINGTON IRON & STEEL CO., LTD., blast-furnace plant, 6*A*.
WORLD, manganese ore deposits, 63*A*.
WROUGHT IRON, manufacture, Aston-Byers process, 127*A*.

X-RAY ANALYSIS, equilibrium diagrams, 70*P*.
X-RAY EXAMINATION:
cold-worked metals, 47*A*.
electrodeposited coatings, 31*A*.
metals, 103*A*., 164*A*., 261*A*., 305*A*.
metals, use of monochromatic patterns, 306*A*.
welded pipe-lines, 152*A*.
X-RAYS, stress measurement, 95*A*., 210*A*., 296*A*., 297*A*.

YIELD POINT, steel, 37*A*., 250*A*.
YOUNGSTOWN SHEET & TUBE CO., rolling-mill plant, 18*A*., 88*A*.

ZAPOROZHSTAL WORKS:
blast-furnace practice, 70*A*., 126*A*., 227*A*.
melting of chromium-steel scrap in electric furnaces, 281*A*.
ZINC:
effect in steel, welding, 294*A*.
electrodeposition, 34*A*.
for preventing corrosion-fatigue, 232*P*.
reaction with iron in galvanising, 157*A*.
spraying, 34*A*.
ZINC COATINGS:
effect on corrosion-fatigue, 56*A*.
production, 33*A*.
tests, British specification, 248*A*.
thickness measurement, 30*A*., 155*A*.
ZIRCONIUM:
determination in alloy steel, 313*A*.
effect in steel, welding, 294*A*.

NAME INDEX.

ABELL, C. D., melting of special pig iron in cupolas, 76*A*.
ABRESCH, K., determination of carbon, 109*A*.
ADCOCK, F., high-purity iron, 274*A*.
AFANAS'EV, A. S.:
ferroxyl indicators for corrosion research, 266*A*.
mist and rain chamber for corrosion tests, 310*A*.
AKLERT, W., thermit welding, 291*A*.
ALEKSEEVA, L. S., heat treatment of chromium magnet steel, 160*A*.
ALLEMAN, N. J., fatigue tests of wire, 96*A*.
ALLEN, N. P., estimation of hydrogen in steel, 257*P*.
ALLENDORF, H., boxless moulds, 78*A*.
ALTENBURGER, C. L., steel manufacture, 182*A*.
AMBROSE, P. M., iron-chromium-manganese alloys, 212*A*.
ANDERSON, C. T., iron-chromium-manganese alloys, 212*A*.
ANDERSON, J. A., elected Member, 2*P*.
ANDREW, J. H., quench ageing, strain ageing and cold working, 238*A*.
ANDREWS, A. I., effect of enamel on enamelling iron, 249*A*.
ANDREWS, W., welding electrodes, 291*A*.
ARMBRUSTER, D. P., radiant tube furnaces, 242*A*.
ARMSTRONG, T. N.:
hardness produced by welding, 151*A*.
impact properties of nickel steel at low temperatures, 38*A*.
ARONOV, S. G., determination of sulphur in coke, 314*A*.
ASBACH, H. R., effect of supersonics on chemical reactions, 225*A*.
ASH, E. J., castability of cast iron, 232*A*.
ASHWORTH, J. A., magnetic tests, 160*A*.
ASSMANN, P., nickel-carbonyl powder, 278*A*.
AUSTIN, J. B., heat etching of steel, 47*A*.
AUVIL, H. S., coking properties of coal, 4*A*, 68*A*.
AVERBUKH, B. D., decarburisation of transformer steel, 144*A*.
AVERY, H. S., ferro-magnetic phases, 206*A*.
AZAROV, K., thickness measurement of enamel coatings, 248*A*.

BABAEV, V., Chromansil steel, 105*A*.
BABCOCK, D. E., welding, 25*A*.
BABLIK, H., reaction of zinc and iron in galvanising, 157*A*.
BAEYERTZ, M., optical pyrometers, 143*A*.
BAILEY, E. T. W., control of open-hearth furnaces, 12*A*.
BAKER, H. W., damping capacity of steel, 209*P*.
BAKEWELL, D. C., electro-tinplating of strip, 248*A*.
BALDWIN, A. T., galvanising practice, 156*A*.
BALLAY, M.:
electroplating practice in France, 29*A*.
quality of electrolytic coatings, 30*A*.
BANFIELD, T. A., dissolution of steel in sulphuric acid, 54*A*.
BANSEN, H., Krupp-Renn process, 74*A*.
BARDENHEUER, P.:
grey cast iron, 76*A*.
manganese loss in open-hearth process, 80*A*.
BARFOOT, W. F., determination of manganese and chromium in steel, 215*A*.
BARKER, W. T., jig for resistance welding of tubes, 198*A*.
BARLOW, T., copper in cast iron, 302*A*.
BÄRMANN, H., zinc-coating processes, 34*A*.
BARRETT, E. P.:
desulphurisation of pig iron, 183*A*.
sponge iron, 74*A*.
BARRETT, L. R.:
action of steam and sulphur dioxide on fireclay, 118*A*.
refractory materials, 118*A*.
BARY, J., phosphatising of steel, 33*A*.
BASHFORTH, G. R., electric furnaces, 82*A*.

BAST, E. C., prevention of flakes, 39*A*.
BASTIEN, P., titanium-boron cast iron, 208*A*.
BATCHELLER, H. G., Pluramelt process, 282*A*.
BATTA, G., pickling process, 28*A*.
BAUKLOH, W.:
effect of gases on dissociation of carbon monoxide, 71*A*.
effect of sulphur dioxide on iron, 166*A*.
production of protective atmospheres, 146*A*.
reduction of titanic acid, 178*A*.
BAUMER, S. D., welding of steel-mill equipment, 151*A*.
BAXTER, A. M., test-piece for investigation of yield point, 250*A*.
BEHAGHEL, G., mineral industries of Upper Silesia, 221*A*.
BEHRENDT, C. A. J., elected Member, 2*P*.
BEHRENDT, G., basic-Bessemer process, 182*A*.
BELAIEW, N. T., life and work of Tschernoff, 210*A*.
BELANI, E., refractory materials, 172*A*.
BELL, G. E., X-ray examination of metals, 305*A*.
BELORUSOV, S., casting of steel, 84*A*.
BELOVA, A. P., nitriding during quenching, 191*A*.
BELYAKOVA, E., reduction of titanium dioxide, 71*A*.
BENGOUGH, G. D.:
corrosion research at Cambridge, 235*P*.
corrosion tests in salt solutions, 58*A*.
BENNEK, H., effect of copper in structural steel, 100*A*., 304*A*.
BENNETT, E. G., magnetic tests, 98*A*.
BENNETT, H. E., thermocouples, 143*A*.
BERNARD, J., weldability of steel, 151*A*.
BERNARD, P.:
deformation of metals, 38*A*.
physics of metals, 203*A*.
BERNEWITZ, M. W. VON, scrap metals, 233*A*.
BERNHARDT, E. O., micro-hardness tester, 299*A*.
BERTHELOT, C.:
coking plant of John Lysaght, Ltd., 4*A*.
BERTHELOT, C. (*contd.*)—
nickel steel for hydrogenation plants, 162*A*.
sulphur recovery from coke-oven gas, 5*A*.
turbo-blowers for gas systems, 226*A*.
use of producer gas at coke ovens, 223*A*.
BERTRAND, P., elected Member, 2*P*.
BEZDENEZHNYKH, A. A., effect of wall thickness of mould on solidification of ingots, 83*A*.
BICKFORD, F. H., flame hardening of Meehanite, 241*A*.
BIGEON, J., phosphatising of steel, 33*A*.
BINNIE, D., segregation in steel, 277*P*.
BIRCH, F., alpha-gamma transformation of iron, 308*A*.
BISCHOF, W., slag formation in open-hearth process, 234*A*.
BLACKHURST, J. N., quench ageing, strain ageing and cold working, 238*A*.
BLANCHARD, J. R., iron-carbon-molybdenum diagram, 52*A*.
BLANCHARD, R., iron ore in Queensland, 63*A*.
BLANK, F., viscosity of metals, 131*A*.
BLAYDEN, H. E., crystallite growth during carbonisation, 174*A*.
BLEAKNEY, H. H., elected Member, 2*P*.
BLISS, L. G., witherite for case-hardening, 241*A*.
BLUMBERG, H., fatigue strength of welded joints, 93*A*.
BÖDDEKER, W., nitrogen in basic-Bessemer steel, 11*A*.
BOGATYREV, YU. M., surface hardening by electric current, 191*A*.
BOGOROSDKIY, A. L., effect of mould design on quality of bottom-poured ingots, 83*A*.
BOHO, M. J., combustion control, 3*A*.
BOK, L. D. C., elected Member, 2*P*.
BOLTON, J. W., welded structures in steel, 200*A*.
BONDY, J. A. DE, manganese steel, 161*A*.
BORNATSKIY, I., high-speed steel, 165*A*.
BORNATSKIY, I. I., chromium-silicon-vanadium steel, 257*A*.
BORUSHKO, M., structure of tyre steel, 262*A*.
BORUSHKO, M. S., gas evolution in steel melting, 280*A*.

Boston, O. W., machinability of steel, 94*A*.
Bottenberg, W., coreless induction furnaces, 235*A*.
Boynton, A. J., gas washing, 176*A*.
Bradley, A. J., W. L. Bragg and C. Sykes :
Paper : "Researches into the Structure of Alloys, 63*P*. Part I—Investigation of Equilibrium Diagrams and Theory of Order-Disorder Transformation." By A. J. Bradley, and W. L. Bragg, 70*P*. "Part II—Experimental Work Concerned with the Order-Disorder Transformation and Allied Subjects." By C. Sykes, 121*P*. *Discussion*, 143*P*. *Correspondence*, 152*P*. *Authors' Reply*, 154*P*.
Brady, J. S., cleaning of steel, 28*A*.
Bragg, Sir William :
structure of matter, 164*A*.
speech at Luncheon, 10*P*.
Bragg, W. L. :
Paper : Researches into the Structure of Alloys. *See* Bradley, A. J.
Braley, S. A., cold-drawing of wire rods, 284*A*.
Brandenberger, E., X-ray examination of welded joints, 152*A*.
Braynin, I., segregation in ingots, 84*A*.
Brenner, A. :
thickness determination of metallic coatings, 155*A*.
thickness measurement of zinc and cadmium coatings, 30*A*.
Bretney, C. E., failure of press tools, 204*A*.
Breunning, W., wire drawing, 86*A*.
Brewer, R. E., coking properties of coal, 174*A*.
Bring, G. G., flotation of mineral oxides, 65*A*.
Brinkmann, G., viscosity of blast-furnace slag, 127*A*.
Bromley, H. J., forging practice, 187*A*.
Brösse, W., determination of benzol in wash oil, 314*A*.
Brown, H. T. G., elected Associate, 3*P*.
Brown, R. L. :
heat transfer in gas flow, 322*P*.
properties of railway wheels, 45*A*.
Brown, V., quenching of steel, 23*A*.
Brownlie, D., sulphur content of coal, 124*A*.
Brühl, F., manganese case-hardening steel, 256*A*.
Brundin, S. E., control of open-hearth furnaces, 133*A*.
Brüning, K., determination of tantalum and niobium, 111*A*.
Bruno, L., solidification of ingots, 13*A*.
Brunst, W., spot-welding machines, 291*A*.
Buchanan, W. Y. :
balanced-blast cupola, 275*A*.
gases in cast iron, 207*A*.
tests of moulding sand, 276*A*.
Buehl, R., transformations in chromium-nickel steel, 105*A*.
Bulle, G. :
oxygen-enriched air for open-hearth furnaces, 278*A*.
steelmaking practice, 133*A*.
Bumm, H. magnetic properties of hardenable alloys, 98*A*.
Bunin, K., melting of cast iron, 230*A*.
Bunin, K. P., whitening of cast iron, 164*A*.
Burns, F. G., heat treatment of drill steel, 22*A*.
Burns, J. L., quenching of steel, 23*A*.
Burns, R. S., ageing of iron and steel, 41*A*.
Burr, W. H., American iron industry, 227*A*.
Bushnyakov, D. Ya., use of caustic soda and caustic potash in heat treatment, 193*A*.

Calvert, A. P. failure of naval boiler tubes, 160*A*.
Cambier, M., coal washing, 272*A*.
Campbell, T. C., mirror finish of strip, 286*A*.
Card, H. S., flame hardening, 190*A*., 241*A*.
Carnegie, H. S., electric equipment of strip mills of Richard Thomas & Co., Ltd., 142*A*.
Carr, L. H., welding of valves, 198*A*.
Carrington, A. H., elected Member, 2*P*.
Carsten, A., use of fluorspar in cupolas, 275*A*.
Case, S. L., sensitivity of steel to cold-work, 47*A*.
Cashmore, H. M., elected Member, 2*P*.
Caskey, G. R., leaded steel, 94*A*.

CATLETT, J. T., atomic hydrogen welding, 244*A*.
CAZAUD, R., effect of protective coatings on fatigue of steel, 56*A*.
CHALMERS, B., hardness at grain boundaries, 402*P*.
CHAMBERS, H. B., tool steels, 162*A*.
CHASE, S., blowing of Bessemer converters, 133*A*.
CHAUDRON, G., corrosion tests, 54*A*.
CHELISHCHEV, E. V., oxygen-content of open-hearth heats, 134*A*.
CHEPURKIN, S. S., output capacity of cold-rolling mill, 240*A*.
CHEREPAKHIN, G., design of open-hearth furnaces, 133*A*.
CHEVENARD, P., damping capacity of steel, 210*P*.
CHIPMAN, J., solubility of nitrogen in iron-silicon alloys, 99*A*.
CHIRKOV, I., metal mixers, 136*A*.
CHIU, Y. C., effect of hydrogen in steel, 255*A*.
CHOUDHURI, K. C., elected Associate, 3*P*.
CHUFAROV, G. I., decarburisation of transformer steel, 144*A*.
CLARK, C. L., effect of molybdenum and vanadium in chromium steel, 46*A*.
CLARK, D., steel castings, 78*A*.
CLARK, H. T., determination of carbon in steel bath, 214*A*.
CLARKE, L., hydrogenation of coal, 69*A*., 226*A*.
CLARKE, S. G., thickness measurement of metallic coatings, 30*A*.
CLAUS, W., viscosity of metals, 131*A*.
CLAUSSEN, G. E.:
  effect of carbon on welding of steel, 26*A*.
  effects of elements in welding, 294*A*.
  metallurgy of welding, 294*A*.
  welding of copper steel, 26*A*.
  welding of tungsten steel, 199*A*.
CLAYTON, D., seizure tests of steel and bronze, 285*A*.
CLEAVES, H. E., preparation of high-purity iron, 7*A*.
CLEMMITT, W. B., use of gases in iron and steel plants, 125*A*.
CLEWS, F. H.:
  action of alkalies on refractories, 119*A*.
  behaviour of sillimanite on pressing, 120*A*.
  jointing cements, 119*A*., 120*A*.
  sillimanite bricks, 121*A*.
CLYNE, R. W., fatigue cracks in springs and axles, 96*A*.
COCHRANE, H. G., manufacture of malleable cast iron in air furnace, 77*A*.
COHEN, M., tempering of high-speed steel, 24*A*.
COHN, W. H., spectrographic and X-ray examination of welds, 306*A*.
COLCLOUGH, T. P.:
  blast-furnace practice, 448*P*.
  steel plant at Corby, 11*A*.
COLOMBET, R., salt-spray corrosion-test apparatus, 56*A*.
COMBER, A. W., magnesite, 66*A*.
COMSTOCK, G. F.:
  applications of titanium, 302*A*.
  effect of titanium in forging steel, 45*A*.
CONE, E. F.:
  heat-treatment plant of Ford Motor Co., 194*A*.
  manufacture of Alnico and Alnic, 98*A*.
CONTRACTOR, G. P., and F. C. THOMPSON:
  Paper: "The Damping Capacity of Steel and its Measurement," 157*P*. *Discussion*, 202*P*. *Correspondence*, 207*P*. *Authors' Reply*, 215*P*.
COOK, E., ferro-magnetic phases, 206*A*.
COOPER, J. H., welding of strip, 149*A*.
COPPOLA, R. F., elected Associate, 3*P*.
COPSON, R. L., corrosion of metals in phosphoric acid industry, 57*A*.
CORIOLIS, E. G. DE, annealing of sheets, 242*A*.
COTTON, D. A., chromium plating of dies, 32*A*.
COUTANT, J. G., heat losses through furnace walls, 3*A*.
CRAIG, JOHN:
  induction as President, 4*P*.
  Presidential Address, 53*P*.
  speech at Luncheon, 12*P*.
CRAMER, R. E., prevention of flakes, 39*A*.
CRAWFORD, W. F., welding of valves, 198*A*.
CROCKETT, C. B., transport in sheet mills, 286*A*.
CROOK, W. J.:
  iron-oxides/lime system, 13*A*.
  iron-oxides/silica system, 12*A*.

Čupr, V., passivation phenomena, 267*A*.
Curran, M. D., Curran-Knowles coking process, 175*A*.
Currie, E. M., Meehanite, 259*A*.
Czternasty, G., tempering of welds by recrystallisation, 200*A*.

Dack, J. C., ironstone mining in Cleveland, 64*A*.
Daeves, K., effect of rest periods on fatigue strength, 251*A*.
Dahl, O., bright annealing of chromium steel, 242*A*.
Dahl, T., design of rolls, 140*A*.
Dahlstrand, H., forgings for turbine rotors, 283*A*.
Danforth, G. L., jun., open-hearth furnaces, 278*A*.
Danilov, V. I., cracks in coke, 226*A*.
Darrah, W. A., gas carburising, 19*A*.
Daubländer, J., determination of niobium and tantalum, 110*A*.
Davenport, E. S., isothermal transformation in steel, 211*A*.
David, M., corrosion of boiler tubes and superheaters, 58*A*.
Davis, D. H., Stump air-flow coal cleaner, 3*A*.
Davis, E. F., heat treatment, 145*A*.
Davis, J. D.:
carbonising properties of coal, 68*A*.
coking properties of coal, 4*A*., 174*A*.
coking tests of coal, 272*A*.
Dawson, H. H., effect of graphite additions on cast iron, 9*A*.
Day, M. J., heat etching of steel, 47*A*.
Dean, R. S., iron-chromium-manganese alloys, 212*A*.
Degischer, E., iron-aluminium-manganese diagram, 212*A*.
Degremont, G., corrosion by water, 166*A*.
Dehlinger, U., X-ray determination of grain size and stresses in cold-worked sheets, 47*A*.
Delano, H. A., sling chains, 304*A*.
Delbart, G., high-strength cast steel, 163*A*.
Demann, W.:
effect of supersonics on chemical reactions, 225*A*.
pitch extraction, 225*A*.
Dement'ev, A., open-hearth practice at Magnitogorsk, 183*A*.
Deppeler, J. H., welding electrodes, 291*A*.
Depralon, L., elected Member, 2*P*.
Derry, L. W., elected Member, 2*P*.
Desch, C. H.:
scratch tests for revealing structure of alloys, 403*P*.
segregation in steel, 277*P*.
structure of alloys, 150*P*.
Dickie, H. A., hot-working properties of steel, 102*A*.
Dickmann, G., Polish foundry industry, 277*A*.
Dienbauer, H., Niessner's oxide-print process, 260*A*.
Dierker, A. H., effect of graphite additions on cast iron, 9*A*.
Dietrich, K., determination of chromium and manganese, 109*A*.
Dietterle, E. W., effect of enamel on enamelling iron, 249*A*.
Digges, T. G., austenite transformation in iron-carbon alloys, 51*A*.
Dill, F. H., shear tests of welds, 294*A*.
Dobbins, N. E.:
action of steam and sulphur dioxide on fireclay, 118*A*.
sillimanite bricks, 121*A*.
Docking, A., use of producer gas, 125*A*.
Dolan, J. J. P., load-carrying capacity of hoisting ropes, 163*A*., 259*A*.
Dolan, T. J., properties of railway wheels, 45*A*.
Dolbonosov, P. E., magnetic sorting of steel, 300*A*.
Donaldson, J. A., castings for enamelling, 181*A*.
Donnelly, H. G., effect of humidity of air on oxidation of steel, 59*A*.
Döring, T., vanadium carbides in steel, 309*A*.
Dorn, J. E., grain size in steel, 48*A*.
Dornblatt, A. J., silver plating, 33*A*.
Dorofeev, D. S., coking of coal, 224*A*.
Doronin, V., chromium-nickel case-hardening steel, 163*A*.
Dörrenberg, O., coreless induction furnaces, 235*A*.
Downie, C. C., electrolytic tinplating of strip, 248*A*.
Doyle, J. A., pyrometry, 287*A*.
Dubois, L., thickness measurer for strip, 240*A*.
Dufty, N. F., slag manipulation in coreless-induction furnaces, 235*A*.

DUMA, J. A.:
heat treatment of massive sections, 195*A*.
heating of large sections, 23*A*.
DUNBECK, N. J., tests of bonding clays, 180*A*.
DÜNNER, moulding sand, 130*A*.
DUPLIN, V. J., deformation of insulating brick under load, 172*A*.
DURANT, L. B., fatigue strength of weld metal, 294*A*.
DURRER, R., reduction of titanic acid, 178*A*.
DWYER, P. foundry of International Harvester Co., 231*A*.

EADS, O. R., cutting tests with butane, propane and acetylene, 245*A*.
EAKIN, C. T., properties of malleable castings, 45*A*.
ECKARDT, S., creep tests, 99*A*.
ECKBERG, A. R.:
tin-coated welding electrodes, 92*A*.
welding of galvanised sheets, 150*A*.
ECKEL, J. C., enamelling of sheets, 157*A*.
EDGE, T., elected Associate, 3*P*.
EDWARDS, C. A., deep drawing tests of sheets, 238*A*.
EICHHOLZ, W., basic-Bessemer process, 182*A*.
EICHINGER, A.:
creep curves, 301*A*.
plastic deformation, 283*A*.
wear of metals, 159*A*.
EILENDER, W.:
effect of hydrogen in steel, 255*A*.
sintered iron, 128*A*.
use of oxygen-enriched blast in basic converters, 79*A*.
EISNER, A., hydrogenation of coal, 69*A*., 226*A*.
EKLUND, L., solubility of nitrogen in steel, 302*A*.
ELAM, CONSTANCE F., test-piece for investigation of yield point, 250*A*.
ELLERTON, G., jun., heat transfer, 68*A*.
EMERSON, R. W., welding of alloy steel, 148*A*.
EMMONS, H., thermocouples, 287*A*.
ENCK, E. G., manganese in coated welding electrodes, 198*A*.
ENDELL, K., viscosity of blast-furnace slag, 127*A*.
ENNIS, J. F., fatigue strength of weld metal, 294*A*.
ERAKHTIN, V., heat treatment of magnet steel, 145*A*.
ERGANG, R., iron-chromium-manganese diagram, 52*A*.
ERKER, A.:
fatigue of fillet welds, 200*A*.
torsional-fatigue strength of fillet welds, 93*A*.
ESS, T. J., blast-furnace of Republic Steel Corporation, 227*A*.
ESSER, H., creep tests, 99*A*.
EULER, H., statistics for rolling-mill operations, 285*A*.
EVANS, R. G., control of rolling-mill operations, 142*A*.
EVANS, U. R.:
Paper: "Report on Corrosion Research Work at Cambridge University Interrupted by the Outbreak of War," 219*P*. *Discussion*, 235*P*. *Author's Reply*, 240*P*.
corrosion of metals in water, 59*A*.
EYLES, G. E. S., determination of sulphur, 109*A*.

FAHLENBRACH, H., transformer steel, 206*A*.
FAIRLEY, T., elected Member, 2*P*.
FARR, H. H., centrifugal casting of pipes, 10*A*.
FARROW, F. D., elected Member, 2*P*.
FATZINGER, R. W., properties of coke, 175*A*.
FAULKNER, V. C., foundry of Midland Electric Manufacturing Co., Ltd., 181*A*.
FAVILLE, F. A., heat transfer, 68*A*.
FEDOROV, A. A., determination of titanium, niobium and zirconium, 313*A*.
FIEGEHEN, E. G., furnace for melting ferro-manganese, 7*A*.
FIELDNER, A. C.:
coking properties of coal, 4*A*., 68*A*., 174*A*.
FINLAYSON, A., manufacture of copper-silicon steel castings, 9*A*.
FINNISTON, H. M., combustibility of coke, 273*A*.
FIORDALIS, V., effect of elements on graphitisation of cast iron, 44*A*.
FISCHER, A., controlled atmospheres in heat treatment, 193*A*.
FISHER, C. H., hydrogenation of coal, 69*A*., 226*A*.
FISHER, J. L., effect of elements on graphitisation of cast iron, 44*A*.

FIZIA, R., effect of vanadium and chromium in high-speed steel, 100*A*.
FLUVOT, J., magnetic tests, 103*A*.
FOMIN, YA. I., drying of coal, 223*A*.
FOOTE, L. R., heat-treatment furnaces, 22*A*.
FÖPPL, O., effect of surface pressing on fatigue strength, 297*A*.
FORD, H. :
Paper : "Heat Transfer in the Flow of Gas Through a Bed of Solid Particles." *See* Saunders, O. A.
FORD, W. F., behaviour of sillimanite on pressing, 120*A*.
FOREST, J. W., spectrographs, 215*A*.
FORNANDER, E., production of iron in Sweden, 6*A*.
FORNANDER, S., temperature measurement of liquid steel, 288*A*.
FORSYTH, R. P., determination of manganese and chromium in steel, 215*A*.
FORTUNE, J. B., blast-furnace tuyeres, 178*A*.
FOSTER, G., welding of locomotives, 26*A*.
FOX, G., use of gases in iron and steel plants, 125*A*.
FOXWELL, G. E., coking industry, 272*A*.
FRANCIS-CARTER, C., electroplating practice in England, 29*A*.
FRANK, P., *p*H indicators, 154*A*.
FRANTSEVITCH, I., structure of tyre steel, 262*A*.
FRANTSEVICH, I. N., gas evolution in steel melting, 280*A*.
FRASER, *Rear-Admiral* B. A., speech at Luncheon, 14*P*.
FRASER, O. B. J., corrosion of metals, 54*A*.
FRENCH, H. J., hardness produced by welding, 151*A*.
FREUND, K., tests of welding operators, 291*A*.
FRISCHMAN, T. A., flame-hardening, 19*A*.
FROLOV, E., rolling of liquid metal, 141*A*.
FRY, A., intercrystalline corrosion of steel, 55*A*.
FUCKE, H., determination of niobium and tantalum, 110*A*.
FUKUI, S., deep-drawing process, 15*A*.
FULLER, T. S., elected Member, 2*P*.

GADD, E. K., heat treatment of steel, 21*A*.
GAGNEBIN, A. P., impact properties of nickel steel at low temperatures, 38*A*.
GALIBOURG, J., relation of strength to corrosion, 53*A*.
GALLAY, YA., Lignostone bearings, 141*A*.
GEBHARD, K., effect of vanadium and chromium in high-speed steel, 100*A*.
GEIGER, J., damping properties of cast iron, 205*A*.
GEIL, G. W., oxidation of steel, 20*A*.
GEILENKIRCHEN, T., silicosis in foundries, 78*A*.
GELLER, W., iron-antimony-cobalt system, 212*A*.
GENSAMER, M., properties of isothermal decomposition products of austenite, 48*A*.
GERHARD, M. H., chromium plating, 155*A*.
GERISCH, R., metal losses in cupolas, 275*A*.
GEROLD, E., effect of rest periods on fatigue strength, 251*A*.
GET, N. N., tension on strip mills, 285*A*.
GHANDY, J. J., blast-furnace practice, 455*P*.
GILBERT, W. W., machinability of steel, 94*A*.
GILL, J. P., nitriding of high-speed steel, 20*A*.
GILLETT, H. W., creep of metals, 42*A*.
GINZBURG, K., deformation-resistance of structural steel, 138*A*.
GIRARDET, L. F., cupola practice, 77*A*.
GIRE, G., corrosion of tinplate, 57*A*.
GISEN, F., stress measurement by X-rays, 297*A*.
GLASER, O., heat treatment of cast iron, 89*A*.
GLAZYUK, I. K., nitriding of steel, 89*A*.
GLIWITZKY, W., acetylene-air explosions, 197*A*.
GOCKOWSKI, S., effect of resiliency of test machine and loading speed on yield point of steel, 37*A*.
GOL'DESHTEYN, V., defects in billets, 185*A*.
GOLDOWSKI, N., corrosion test for stainless steel, 56*A*.
GOLIKOV, I. :
annealing of tool steel, 146*A*.
layer formation in chromium-nickel steel, 204*A*.

GOLIKOV, I. N. :
determination of inclusions in steel, 263*A*.
measurement of depth of carburisation, 305*A*.
GONSER, B. W., controlled atmospheres for heat-treatment furnaces, 242*A*.
GOODCHILD, J. H., iron ore on Mediterranean seaboard, 221*A*.
GOODGER, A. H., tests of welds, 244*A*.
GOODWIN, T. R., "rat-tailing" on flat castings, 131*A*.
GORDON, G. E., spark tests, 97*A*.
GORELIK, A., electron defectoscope, 260*A*.
GORELIK, S., pitch coke, 225*A*.
GRAHAM, A. K., electrolyte films, 31*A*.
GRANAT, I. YA., effect of wall thickness of mould on solidification of ingots, 83*A*.
GRAY, T. H., hardness conversion chart, 41*A*.
GRDINA, YU., rolling of liquid metal, 141*A*.
GREEN, A. T. :
action of alkalies on refractory materials, 119*A*.
action of slags on refractories, 120*A*.
action of steam and sulphur dioxide on fireclay, 118*A*.
behaviour of sillimanite on pressing, 120*A*.
jointing cements, 119*A*., 120*A*.
refractory materials, 118*A*.
sillimanite bricks, 121*A*.
viscosity of slags and glasses, 121*A*.
GREEN, D. F., elected Associate, 3*P*.
GREEN, W. B., elected Member, 2*P*.
GREENAWALD, P. B., development of stainless steel, 304*A*.
GREENE, O. V., torsion-impact test, 37*A*.
GREGORY, E. :
Paper : "Anti-Piping Compounds and Their Influence on Major Segregation in Steel Ingots," 263*P*. *Discussion*, 273*P*. *Correspondence*, 278*P*. *Author's Reply*, 282*P*.
heat transfer in blast-furnace, 317*P*.
GRENINGER, A. B., austenite-martensite transformation in steel, 50*A*.
GREY-DAVIES, T. :
open-hearth practice, 81*A*.
steel manufacture, 185*A*.
GRIDNEV, V., steel sheets, 162*A*.
GRIGOR'EVA, K. S., tension on strip mills, 285*A*.
GRIMMENDAHL, F., determination of pyrites and sulphur in coal, 314*A*.
GRISWOLD, G. Z., powder metallurgy, 229*A*.
GROVER, A. E., foundry costing, 132*A*.
GRUNER, P., design of mill stands, 188*A*.
GUDTSOV, N. T. :
annealing of cold-rolled strip, 91*A*.
heat treatment of chromium magnet steel, 160*A*.
GUILLET, L., modulus of elasticity of alloys, 295*A*.
GUILLET, L., jun. :
cobalt-cerium cast iron, 208*A*.
single metal crystals, 306*A*.
GUINIER, A., X-ray patterns, 306*A*.
GUITTON, L., effect of inclusions on corrosion, 55*A*.
GULYAEV, A. P., equilibrium diagrams of ferrous alloys, 105*A*.
GULYAEV, B. B., solidification of ingots, 235*A*.
GUTHMANN, K., ore-preparation plants, 65*A*.

HAARMANN, R., attack of zinc on iron in galvanising, 157*A*.
HAAS, K., welding machines, 92*A*.
HALLA, F., electrolytic iron, 179*A*.
HALLIMOND, A. F., magnetic survey of hematite ore, 221*A*.
HAMMERQUIST, W. L., electrolytic manganese, 73*A*.
HANEL, R., lead-bearing steel, 202*A*.
HANEMANN, H., micro-hardness tester, 299*A*.
HANSON, V. D., Stump air-flow coal cleaner, 3*A*.
HARDER, O. E., carbide solution in steel, 49*A*.
HARDWICK, J. V., elected Member, 2*P*.
HARPER, F. W., bronze-welding of cast iron, 26*A*.
HARR, A., recovery of vanadium, 82*A*.
HARRIS, A. C., segregation in steel, 279*P*.
HARRISON, W. N., properties of enamels, 248*A*.
HARTFORD, C. E., corrosion of metals in phosphoric acid industry, 57*A*.
HARTLEIF, G., spectrum analysis, 313*A*.

HARTLEY, A. L., standardisation of steel, 102*A*.
HARTRIDGE, H., micro-gas analysis, 111*A*.
HATFIELD, W. H. :
corrosion research at Cambridge, 235*P*.
heat-resistant steel, 207*A*.
metallurgical research, 164*A*., 210*A*.
segregation in steel, 275*P*.
structure of alloys, 143*P*.
HAUL, R., ferro-magnetism, 99*A*.
HAUPT, G., properties of alloy steel at low temperatures, 253*A*.
HAVEN, W. A. :
Paper : "The Manufacture of Pig Iron in America," 405*P*. *Discussion*, 448*P*., *Correspondence*, 453*P*.
HAWKINS, R. D., hack-saw blades, 289*A*.
HAYMAN, J. C. :
consumption of refractories in open-hearth furnaces, 66*A*.
evaluation of basic refractories, 66*A*.
HAYWOOD, F. W., electric heat-treatment furnaces, 242*A*.
HEIMAN, S., electrolyte films, 31*A*.
HEINRICH, H., passivity of chromium, 267*A*.
HELIN, E., cracks in welds, 292*A*.
HELLER, L., magnetic properties of roasted spathic ore, 65*A*.
HEMPEL, M. :
effect of type of stress on fatigue strength, 40*A*.
fatigue of helical springs, 298*A*.
HENDERSON, J., remarks on Haven's paper, 448*P*.
HENKE, G., manganese loss in open-hearth process, 80*A*.
HENON, G., thin castings, 131*A*.
HENRY, J. R., welding of presses, 150*A*.
HENRY, O. H., metallurgy of welding, 294*A*.
HERASYMENKO, P., manganese equilibria in steelmaking, 279*A*.
HERBIET, H., welding of structural steel, 293*A*.
HERMANN, C. C. :
cleaning of metals, 153*A*.
electrolytic pickling, 153*A*.
HERZIG, A. J. :
hardenability of molybdenum steel, 308*A*.
iron-carbon-molybdenum diagram, 52*A*.
HERZOG, E. :
corrosion of aluminium-chromium steel, 58*A*.
corrosion of steel by nitrates, 57*A*.
oxide films, 59*A*.
HESS, W. F., spot welding of steel, 149*A*.
HEWITT, G. W., valuation of iron ore, 274*A*.
HEYES, J., spectrum analysis, 313*A*.
HIGGINS, J. W., thickness determination of metallic coatings, 154*A*.
HIGGINS, R., deep-drawing tests of sheets, 238*A*.
HILDAGE, H. T., production research, 12*A*.
HILDORF, W. G., effect of molybdenum and vanadium in chromium steel, 46*A*.
HILTENKAMP, H., tests of early iron bar, 209*A*.
HINMAN, C. W. :
drawing of sheet-metal articles, 15*A*.
flow of metals in drawing, 15*A*.
HIRST, H., pyrometry, 287*A*.
HOAR, T. P. :
determination of sulphur, 109*A*.
potential difference between attacked and unattacked surfaces of metals, 236*P*.
use of potential measurements in corrosion research, 54*A*.
HOCH, G., effect of vanadium on grain disintegration in chromium nickel steel, 211*A*.
HODAPP, W. L., spheroidising of steel, 52*A*.
HODGE, J. C., stress-corrosion cracking of chromium-nickel steel, 56*A*.
HODGE, W. W., treatment of waste pickling liquor, 246*A*.
HOENICKE, E. C., permanent moulds, 130*A*.
HOFF, H., aluminium coatings, 156*A*.
HOFFMAN, R. A., black molybdenum plating, 32*A*.
HOFMANN, E., heat transfer, 223*A*.
HOFSTEN, S. VON :
behaviour of hydrogen in steelmaking, 233*A*.
production of steel in Sweden, 11*A*.
HOHAGE, R. :
backing-rolls for cold-rolling mills, 88*A*.
solidification of ingots, 83*A*., 185*A*.
HÖHLE, H., rolling flat wire, 87*A*.

HOLBROOK, W. F., desulphurisation of pig iron, 183*A*.
HOLLOMON, H., transformations in chromium-nickel steel, 105*A*.
HOLLWEG, H., displacement of cores in moulds, 276*A*.
HOLMES, C. R., coking properties of coal, 174*A*.
HOLMES, C. W. H.:
coal washing, 173*A*., 272*A*.
froth flotation, 173*A*.
HOLTON, A. L., use of coke breeze in producers, 226*A*.
HOLZWEILER, C., design of rolls, 140*A*.
HOMERBERG, V. O., ferro-magnetic phases, 206*A*.
HOMÈS, G. A., properties of metals at high temperatures, 43*A*.
HONGARDY, H., *see* Hougardy, H.
HOOD, F. J., elected Member, 2*P*.
HOOKHAM, G., elected Member, 2*P*.
HORN, L., formation of nuclei in metallic melts, 282*A*.
HORNE, H. F., use of phenolic resin in steel industry, 17*A*.
HOTHERSALL, A. W.:
adherence of electrodeposited coatings, 31*A*.
protective value of oxide films, 237*P*.
HOUDREMONT, E.:
bend tests of welds, 244*A*.
development in alloy steels, 46*A*.
effect of copper in structural steel, 100*A*., 304*A*.
fatigue tests, 251*A*.
HOUGARDY, H., development of alloy steel in Germany, 303*A*.
HOWAT, D. D., fuel efficiency in iron industry, 175*A*.
HRUSKA, J. H.:
Rockwell hardness tests, 299*A*.
welding of sulphur steel, 291*A*.
HUDSON, J. C.:
corrosion research in England, 53*A*.
dissolution of steel in sulphuric acid, 54*A*.
protective coatings for steel, 310*A*.
protective paints, 35*A*.
HUGILL, W., action of slags on refractories, 120*A*.
HULL, R. O.:
black molybdenum plating, 32*A*.
current density ranges in electrodeposition, 29*A*.
HUME-ROTHERY, W., structure of alloys, 146*P*.
HURSH, R. K., slagging-test furnace, 1*A*.
HURST, J. E.:
effect of molybdenum, tungsten, titanium and calcium silicide in cast iron, 43*A*.
stresses in cast iron, 203*A*.

IMHOFF, W. G.:
galvanising practice, 35*A*.
galvanising window-frames, 248*A*.
INGERSOLL, E. F., stainless steel, 304*A*.
IRVINE, A., pattern-making, 130*A*.
ISENBURGER, H. R., X-ray examination of electrodeposited coatings, 31*A*.
ISHII, R., determination of silicon, 312*A*.
IVANOV, P. N., iron oxide content of basic slag, 279*A*.
IYER, L. A. N., chromite in India, 221*A*.

JACKMAN, H. W., coking properties of coal, 68*A*.
JACKSON, A. L., galvanising plant of International Derrick and Equipment Co., 35*A*.
JACKSON, C. E., impact values of welded joints, 27*A*.
JACKSON, H. H., elected Member, 2*P*.
JACKSON, W. G.:
load-carrying capacity of hoisting ropes, 163*A*., 259*A*.
JACQUET, P. A., electrolytic polishing, 260*A*.
JAY, A. H., constitution of alloys, 145*P*.
JENKS, W. A., elected Member, 2*P*.
JENNINGS, L. D., flame hardening, 144*A*.
JENTZSCH-USCHINSKI, CHARLOTTE, iron-silicon-vanadium diagram, 309*A*.
JETER, E. C., steel castings for tractor parts, 276*A*.
JETTER, L. K., age-hardening, 41*A*.
JEVONS, J. D.:
deep-drawing tests, 15*A*.
sheets for deep-drawing and pressing, 187*A*.
tools for deep-drawing and pressing, 15*A*., 86*A*., 138*A*.
JOHANNSEN, F., Krupp-Renn process, 74*A*.
JOHANSEN, F. C., endurance tests of welds, 152*A*.
JOHANSSON, F., behaviour of hydrogen in steelmaking, 233*A*.

JOHNSON, A., gating of castings, 276*A*.
JOHNSON, C. M., perchloric acid in analysis, 109*A*.
JOHNSON, R. I., detection of defects in protective coatings, 29*A*.
JOHNSON, W. A., nucleation and growth, 103*A*.
JOLIVET, H., transformation of austenite, 212*A*.
JOMINY, W. E., "end-quench" hardness test, 40*A*.
JONES, H. G., charcoal-iron industry, 75*A*.
JONES, J. A., effect of work-hardening capacity on tensile properties of austenitic steel, 296*A*.
JONES, W. B., welding of locomotive frames, 150*A*.
JONES, W. M., iron ore in New Zealand, 63*A*.
JOSEPH, T. L.:
reduction of iron ore by carbon monoxide, 178*A*.
sulphur control in basic open-hearth process, 135*A*.
JOUBLANC, J. C., arc welding of wire, 197*A*.
JUDGE, E. T., rolling-mill practice, 87*A*.
JUNGBLUTH, H., standardisation of cast iron, 163*A*.

KABANOV, L. YA., Aston-Byers process, 127*A*.
KALLEN, H., manganese case-hardening steel, 256*A*.
KALLING, BO.:
behaviour of hydrogen in steel-making, 233*A*.
Rennerfelt-Kalling process, 73*A*.
KAMENEV, S., rolling of rectangular tubes, 189*A*.
KANTER, J. J.:
creep of bolts, 301*A*.
creep tests, 43*A*.
KARMAZIN, V., desulphurisation of iron and steel, 280*A*.
KARPOV, A. V.:
fatigue of riveted and welded joints, 252*A*.
fatigue of steel, 205*A*.
KARYAZIN, P., layer formation in chromium-nickel steel, 204*A*.
KATSNEL'SON, D., melting of cast iron, 230*A*.
KAUP, K., mining in Salzgitter Hills, 64*A*.
KAWAMOTO, M., detection of fatigue by etching, 205*A*.
KEELOR, W. B., welding of clad steel, 199*A*.
KEHL, G. L., effect of pickling on fatigue of steel, 39*A*.
KELLER, J. D., calculation of heating time, 186*A*.
KELLEY, F. C., brazing of chromium steel, 93*A*.
KEMPE, J., Swedish iron-ore industry, 64*A*.
KEMPF, H., determination of carbon, 109*A*.
KENNEFORD, A. S., machinability tests, 202*A*.
KENYON, R. L., ageing of iron and steel, 41*A*.
KEOGH, C. P., surface hardening, 190*A*.
KERNAHAN, W. C.:
control system at Ford Works, 125*A*.
rolling-mill plant of Youngstown Sheet and Tube Co., 18*A*.
KERNOLL, R. T., welding of boiler drums, 150*A*.
KERWIN, G. F., blast-furnace of Republic Steel Corporation, 227*A*.
KEY, J. A., properties of coke, 175*A*.
KEYS, N., manufacture of heat-resistant steel, 182*A*.
KHABAROV, I., throughput capacity of soaking pits, 186*A*.
KHARCHENKOVA, N., thickness measurement of enamel coatings, 248*A*.
KHEYFETS, I., steel sheets, 162*A*.
KHLEBNIKOV, A., basic open-hearth practice, 79*A*.
KHORUNOV, D. S., effect of nature of coke on oxidising zone in blast-furnace, 70*A*.
KIDAO, T. V. N., heat treatment of stainless steel, 289*A*.
KIEFER, G., electrolytic polishing of stainless steel, 246*A*.
KIEFT, C. W., elected Member, 2*P*.
KINGSWOOD, V. S., elected Associate, 3*P*.
KINZEL, A. B., development of alloys, 100*A*.
KITTREDGE, J. P., pulverised coal for open-hearth furnaces, 3*A*.
KLAIN, P., hardening characteristics of steel, 22*A*.
KLAS, H., corrosion of hot-water pipes, 266*A*.
KLINE, E., elected Member, 2*P*.

KLINGENSTEIN, T., manufacture of cast iron in electric furnace, 77*A*., 129*A*., 230*A*.
KLINGER, P.:
determination of niobium, tantalum and titanium, 110*A*.
polarographic analysis of alloy steel, 214*A*.
KNÖS, O., behaviour of hydrogen in steelmaking, 233*A*.
KOCH, A., pig-casting machines, 178*A*.
KOCH, W.:
determination of niobium, tantalum and titanium, 110*A*.
polarographic analysis of alloy steel, 214*A*.
KOCHENDÖRFER, A., X-ray determination of grain size and stresses in cold-worked sheets, 47*A*.
KOEPPEL, C., distillation of benzol wash oil, 69*A*.
KOH, P. H., tempering of high-speed steel, 24*A*.
KOHLMEYER, E. J.:
application of heat, 71*A*.
reduction of oxides, 126*A*.
KOLB, H. D.:
lubrication of rolling mills, 188*A*.
properties of greases, 17*A*.
KOLOSKOV, V., control of blast-furnace process, 179*A*.
KOLOSOV, M., manufacture of heat-resistant steel, 182*A*.
KOMAR, A., reduction of titanium dioxide, 71*A*.
KONDIC, V., elected Associate, 3*P*.
KONSCHAK, M., occurrence of nitrogen oxides and carbon monoxide in welding, 292*A*.
KOOTZ, T., basic-Bessemer process, 182*A*.
KOPP, H.:
cast-iron crankshafts, 44*A*.
manufacture of cast iron in electric furnace, 77*A*., 129*A*., 230*A*.
KÖRBER, F.:
effect of type of stress on fatigue strength, 40*A*.
plastic deformation, 283*A*.
KORENMAN, I. M., determination of nickel, 312*A*.
KOROSTIK, P., control of blast-furnace process, 179*A*.
KOSOLAPOV, G. F., nitriding of steel, 90*A*.
KOSSMANN, W., production of special steels in Germany, 136*A*.
KÖSTER, W., iron-cobalt-beryllium system, 106*A*.
KOTOV, V. I., depth of blast-furnace hearths, 70*A*.
KOVALENKO, I., gas evolution in open-hearth practice, 280*A*.
KOVALENKO, S. A., gas evolution in steel melting, 280*A*.
KOZLOVICH, I.:
blast-furnace practice, 126*A*.
blast-furnace practice at Zaporozhstal Works, 70*A*.
KRAINER, H., creep of alloy steel, 42*A*.
KRAMAROV, A. D., viscosity of open-hearth slags, 235*A*.
KRÄMER, F., chromium-molybdenum structural steel, 161*A*.
KRANER, H. M., alumina and silica refractories, 222*A*.
KRASSIUK, B. A., effect of grain size on corrosion, 310*A*.
KRATENKO, N., repair of blast-furnace, 70*A*.
KRATH, E., polarographic analysis of alloy steel, 214*A*.
KRAUSE, D. E., effect of phosphorus in steel, 101*A*.
KREITLING, L. L., elected Associate, 3*P*.
KREMENER, A., foundry in Palestine, 277*A*.
KREUTZER, C., use of carburetted coke-oven gas in open-hearth furnace, 69*A*.
KRISCH, A.:
deep-drawing tests of alloy steel, 239*A*.
hardening of chromium-molybdenum and chromium-nickel steel, 97*A*.
properties of alloy steel at low temperatures, 253*A*.
relation between elongation and reduction of area, 95*A*.
KRISHNAN, M. S., mineral resources of Central Provinces of India, 221*A*.
KRISHNASWAMY, N. R., elected Associate, 3*P*.
KRITZLER, G., hardening of cast iron, 289*A*.
KRON, E. C., flowability of cast steel, 231*A*.
KUROKAWA, K., elected Member, 2*P*.

LACY, E. D., hard-surfacing of steel, 26*A*.
LAGERKVIST, S. A., surface-hardening by electric current, 191*A*.

LANDERGREN, S., spectrum analysis, 111*A*.
LANE, P. S., wear of cylinders, 42*A*.
LANTIN, F., coal washing, 68*A*.
LANTZ, N. B., burner for heating furnace, 85*A*.
LAQUÉ, F. L., corrosion of metals, 54*A*.
LARDNER, E., elected Associate, 3*P*.
LASHKO, L. M., structure of tyre steel, 262*A*.
LASHKO, N. F., gas evolution in steel melting, 280*A*.
LAUDERDALE, R. H., carbide solution in steel, 49*A*.
LAUTNER, W. F., converting worn rolls, 189*A*.
LAVRENT'EV, L. S., transformation of austenite, 307*A*.
LAW, S. W., elected Associate, 3*P*.
LAWRENSON, R., elected Member, 2*P*.
LAWRIE, W. B., awarded Williams Prize, 7*P*.
LEBEDEV, B. G., determination of nitrogen in iron-chromium alloys, 312*A*.
Leckie, A. H., measurement of furnace temperatures, 287*A*.
LECLERC, E., pickling process, 28*A*.
LEDER, P., metal spraying, 35*A*.
LEEDER, J., spheroidising of steel, 52*A*.
LEETCH, S.:
steel foundry practice, 9*A*.
elected Member, 2*P*.
LEGAT, H., chromium-manganese steel, 257*A*.
LEGGE, E. E., austempering, 24*A*.
LEHMKÜHLER, H., Krupp-Renn process, 74*A*., 128*A*.
LEMOINE, R., duplex process, 281*A*.
LEMOINE, R. P., steel plant at Corby, 11*A*.
LEPP, H.:
Paper: The Oxygen/Hydrogen/Molten-Iron System, 329*P*. *Correspondence*, 338*P*.
elected Member, 2*P*.
LEROY, A., corrosion of welds, 57*A*.
LESHER, C. E., Disco carbonisation process, 273*A*.
LESTER, H. H., X-ray examination, 103*A*.
LEUN, A. V., refractories for steel industry, 222*A*.
LEVASTEVICH, M. A., cracks in coke, 226*A*.
LEVINA, B. L., addition of titanium-ore concentrate to steel, 137*A*.
LEWIS, F. V., elected Associate, 3*P*.
LEWIS, L. L., dry-air blast, 126*A*.
LINDE, R. VON, thermal conductivity of metals, 207*A*.
LINDSEY, A. J., thickness determination of metallic coatings, 30*A*.
LIPCHIN, N. N., nitriding of steel, 89*A*.
LIPLAVK, I. L., effect of grain size on corrosion, 310*A*.
LIPPERT, T. W., electrolytic polishing of stainless steel, 246*A*.
LIPSON, H., structure of cementite, 144*P*.
LITCHFORD, E. R., elected Member, 2*P*.
LJUNGGREN, Bo O. W. L.:
Paper: "Method of Sclero-Grating Employed for the Study of Grain Boundaries and of Nitrided Cases; Grain Structures Revealed by Cutting," 341*P*. *Discussion*, 401*P*.
awarded Carnegie Silver Medal, 7*P*.
LLOYD, C. A., elected Associate, 3*P*.
LLOYD, H. D. L., wire ropes, 16*A*.
LOGAN, K. H., corrosion of metals in soil, 167*A*.
LONGDEN, E., shrinkage and contraction of castings, 181*A*.
LONGENECKER, C.:
plant of Continental Steel Corporation, 278*A*.
plant of Tennessee Coal, Iron, and Railroad Co., 6*A*.
LOOS, C. E., shear tests of welds, 294*A*.
LORIG, C. H.:
effect of phosphorus in steel, 101*A*.
flowability of cast steel, 231*A*.
hardening characteristics of steel, 23*A*.
LOWE, C. S., silver plating, 33*A*.
LUCAS, J., salt-spray corrosion-test apparatus, 56*A*.
LUEG, W., rolling flat wire, 87*A*.
LÜER, H., use of blast-furnace slag for tar-macadam, 72*A*.
LUNN, D. C. F., elected Associate, 3*P*.
LUYKEN, W., magnetic properties of roasted spathic ore, 65*A*.
L'VOV, G., defects in billets, 185*A*.
LYON, S. W., effect of hardness and temperature on steel, 41*A*.

MAACK, H. W., steel foundry, 181*A*.
MCADAM, D. J., jun.:
oxidation of steel, 20*A*.

McAdam, D. J. (*contd.*)
tensile properties of chromium-nickel steel, 37*A*.
McBane, W. W., coiling of strip, 240*A*.
McCance, A. :
oxygen/hydrogen/molten-iron system, 338*P*.
structure of alloys, 149*P*.
awarded Bessemer Gold Medal, 5*P*.
McCarroll, R. H., steel castings for tractor parts, 276*A*.
McDonald, H. J., heat capacity of iron carbide, 207*A*.
McDonough, L. J., welding of presses, 150*A*.
McDowell, J. F., fatigue of steel, 297*A*.
McDowell, J. S., sprung-arch roofs for furnaces, 2*A*.
MacGregor, C. W., stress-strain curves, 295*A*.
Machu, W., production from gaseous state of metallic coatings, 154*A*.
McLain, W. R., blast-furnace refractories, 222*A*.
Maetz, H., desulphurisation reactions, 227*A*.
Magrath, J. G. :
descaling of steel, 153*A*.
spraying of metals, 248*A*.
Mailänder, R. :
effect of cracks on stress of specimen under constant bending moment, 250*A*.
fatigue tests, 252*A*.
tests of early iron bar, 209*A*.
Main, S. A. :
damping capacity of steel, 206*P*.
segregation in steel, 281*P*.
structure of cementite, 153*P*.
Maksimenko, M. S., reduction of silica and alumina, 73*A*.
Maksimov, V., life of acid furnace bottoms, 67*A*.
Malaval, P. :
deformation of metals, 38*A*.
physics of metals, 203*A*.
Mallett, M. W., slip-casting of crucibles, 1*A*.
Malloy, J. B., slag control, 183*A*.
Malyshev, K. A., grain growth in steel, 104*A*.
Mamot, A., cleaning of slag pockets, 184*A*.
Mance, H. W., elected Associate, 3*P*.
Manning, G. K., inclusions in carburised parts from clay packing, 190*A*.
Mansini, P., grain size in steel, 47*A*.
Margolin, K., heat treatment of magnet steel, 145*A*.
Marks, E., silicon-steel sheets, 300*A*.
Markus, H., electrolytic polishing, 260*A*.
Marshall, W. W., spectrum analysis, 313*A*.
Mart, J. N., blowing plant at Duddon furnace, 8*A*.
Marthens, R. S., gear manufacture, 202*A*.
Martin, E. D., rolling of wide strip, 88*A*.
Martin, G., determination of stresses by X-rays, 95*A*.
Martin, M. W., burner for heating furnace, 85*A*.
Martin, P. V., blast-furnace reactions, 7*A*.
Masing, G. :
cold working of metals, 38*A*.
formation of nuclei in metallic melts, 282*A*.
Mathers, F. C., effect of complex cations in plating baths, 32*A*.
Mathias, E. V., elected Associate, 3*P*.
Mathieu, K., transformations in manganese steel, 264*A*.
Maurer, E. :
corrosion of chromium-nickel and chromium-manganese steels, 107*A*.
vanadium carbides in steel, 309*A*.
Mawhinney, M. H., reheating furnaces, 85*A*., 186*A*.
Mebs, R. W., tensile properties of chromium-nickel steel, 37*A*.
Mehl, R. F. :
age-hardening, 41*A*.
electrolytic polishing, 260*A*.
nucleation and growth, 103*A*.
Mehrtens, J., casting ladles, 276*A*.
Meier, K., determination of tantalum and niobium, 111*A*.
Meldahl, A., tests of gears, 253*A*.
Merchant, H. J., elected Associate, 3*P*.
Mesle, F. C., adherence of electrodeposited coatings, 31*A*.
Meunier, F., Huey corrosion test, 56*A*.
Meyer, A., combustion turbines, 176*A*.
Meyer, F., manganese case-hardening steel, 256*A*.
Meyer, H. H., transformer steel, 206*A*.
Mikhailov, V., reduction of titanium dioxide, 71*A*.

MILLER, J. L., stress-corrosion cracking of chromium-nickel steel, 56*A*.
MINARIK, R. S., selective hardening, 20*A*.
MITCHELL, R. W.:
cleaning of metals, 153*A*.
electrolytic pickling, 153*A*.
MITCHELL, W. M., polishing of stainless steel, 94*A*.
MITSCHE, R., Niessner's oxide-print process, 260*A*.
MIYAKE, S., corrosion of iron by electron diffraction, 107*A*.
MOHLER, F., gauge control for strip mills, 189*A*.
MOHR, E., bend-tensile test, 203*A*.
MOINARD, J., corrosion in petrol refineries, 57*A*.
MOISEEVA, KH. M., determination of sulphur in coke, 314*A*.
MÖLLER, H., determination of stresses by X-rays, 95*A*.
MONMA, K., cracks in quenched steel, 290*A*.
MOORE, D. G., properties of enamels, 248*A*.
MOORE, R. R., fatigue tests, 158*A*.
MOORE, W. D., cast iron pipe, 304*A*.
MORGAN, E., chromium-silicon cast iron, 303*A*.
MORRAL, F. R., corrosion products from galvanised sheets, 267*A*.
MORRISON, G. K., rational analysis of African coal, 272*A*.
MORRISON, J. G., nitriding of high-speed steel, 20*A*.
MORRISON, J. L. M., yield of mild steel, 250*A*.
MORRISON, J. W., heat treatment of wire by resistance heating, 194*A*.
MOSS, C., iron-chromium-manganese alloys, 212*A*.
MOTOK, G. T., gases in steel, 208*A*.
MOTT, R. A.:
swelling of coal, 174*A*.
tar yield from producer coals, 125*A*.
MOUFANG, R., effect of cracks on stress of specimen under constant bending moment, 250*A*.
MOYNE, P., corrosion in petrol refineries, 58*A*.
MOZHAROV, V., duration of boil in basic open-hearth practice, 80*A*.
MÜLLER, E. A. W., non-destructive tests, 305*A*.
MÜLLER, F. H., welding of castings, 199*A*.
MÜLLER, H. G., texture of iron-nickel-copper alloys, 103*A*.
MÜLLER, W. J., effect of cathodic reactions on corrosion, 54*A*.
MUSSGNUG, G.:
blast-furnace slag, 72*A*.
use of acid blast-furnace slag, 7*A*.
MUZOVSKAYA, N. V., determination of iron in ferro-vanadium, 311*A*.
MYERS, R. H., rimming steel, 185*A*.

NAUJOKS, W., forging practice, 187*A*.
NAUMANN, F., venting of moulds, 130*A*.
NAZAROVA, G., Chromansil steel, 105*A*.
NAZAROVA, T., quenching of steel, 147*A*.
NEERFELD, H., determination of stresses by X-rays, 95*A*.
NEHL, F., alkali-resistance of steel, 107*A*.
NEMSER, D. A., effect of nickel in cutting tools, 100*A*.
NEUBERGER, A., polarometric titration, 215*A*.
NEUMANN, G., metering of gases, 273*A*.
NEUMEISTER, H., effect of copper in structural steel, 100*A*., 304*A*.
NEUWIRTH, F., Niessner's oxide-print process, 260*A*.
NEWALL, A. P., manufacture of bolts, 14*A*.
NEWBERRY, C. W., tyre failures, 251*A*.
NEWELL, H. D., creep of chromium-molybdenum steel, 207*A*.
NEWELL, W. C.:
Paper: "The Estimation of Hydrogen in Steel and Other Metals," 243*P*. *Discussion*, 254*P*. *Correspondence*, 257*P*. *Author's Reply*, 260*P*.
NILSSON, K. F., elected Associate, 3*P*.
NISHIHARA, T.:
detection of fatigue by etching, 205*A*.
internal friction in fatigue tests, 205*A*.
NISHINA, T., magnetic properties of iron-nickel alloys, 300*A*.
NIWA, S., nickel alloys for mining industry, 161*A*.
NORBURY, A. L., chromium-silicon cast iron, 303*A*.

NORTHCOTT, L. F. C., segregation in steel, 278*P*.
NORTON, C. L., jun., deformation of insulating brick under load, 172*A*.
NORTON, F. H., load test for refractories, 1*A*.
NOTEBAERT, C. C., preheating of metals for welding, 25*A*.
NOVIK, A., ladle stoppers, 184*A*.
NOVIKOVA, L. N., ferroxyl indicator for corrosion research, 266*A*.
NOWAK, E., roll turning, 87*A*.
NOY, J. M., witherite for case-hardening, 241*A*.

OBREMSKI, M. J., heat treatment of shells, 21*A*.
ODING, I. A., creep of metals, 301*A*.
OELSEN, W., desulphurisation reactions, 227*A*.
OFFENHAUER, C. M., effect of pickling on fatigue of steel, 39*A*.
OKSYUZOV, P., segregation in ingots, 84*A*.
OLDERSHAW, F., monolithic linings for cupolas, 123*A*.
OLIFERENKO, J. Z., cracks in coke, 226*A*.
OLIVER, D. A.:
structure of alloys, 148*P*.
elected Member, 2*P*.
OMBERG, T., temperature measurement of liquid steel, 288*A*.
O'NEILL, H.:
anti-piping compounds, 281*P*.
damping capacity of steel, 207*P*.
endurance tests of welds, 152*A*.
hardness at grain boundaries, 401*P*.
structure of alloys, 153*P*.
welding and cutting of low-alloy structural steel, 92*A*.
OSANN, B., pouring time for castings, 130*A*.
OSTROUMOV, N. P., effect of molybdenum in chromium steel, 255*A*.
O'SULLIVAN, P., elected Member, 2*P*.
OTTO, C., coke ovens, 272*A*.

PAGE, A. H. C., welding of locomotives, 26*A*.
PALMÆR, E., overvoltage of hydrogen on metals, 55*A*.
PALMÆR, W.:
corrosion tests, 54*A*.
rate of rust formation as a function of temperature, 54*A*.
PAMELY-EVANS, O. G., heat-treatment furnaces, 91*A*.
PANYUSHKIN, N., rolling of rectangular tubes, 189*A*.
PARKE, R. M.:
hardenability of molybdenum steel, 308*A*.
iron-carbon-molybdenum diagram, 52*A*.
PARRY, J. H., elected Member, 3*P*.
PARTRIDGE, E. P., caustic embrittlement of boiler plate, 167*A*.
PASCHKE, F., effect of insufficiently-dried cores on defects in castings, 130*A*.
PATTERSON, J. A., high-temperature bonding mortars, 123*A*.
PAUES, J., control of open-hearth furnaces, 133*A*.
PAWLEK, F., bright annealing of chromium steel, 242*A*.
PEARCE, J. G., developments in foundry practice, 180*A*.
PEARL, W. A., heat effects in welding, 148*A*.
PEARSALL, E. B., properties of isothermal decomposition products of austenite, 48*A*.
PECU, C. C., lubrication of rolling mills, 240*A*.
PEFFER, P., straightening of plates, 188*A*., 286*A*.
PEHRSSON, E. G., elected Member, 3*P*.
PELLISSIER, G. E., jun., electrolytic polishing, 260*A*.
PERKINS, J. F., optical pyrometers, 143*A*.
PERRY, H. W., stainless steel for aircraft, 257*A*.
PETERSEN, C., measurement of stress, 210*A*.
PETERSON, R. E., fatigue of electrical machinery, 97*A*.
PETIN, J., dimensions of gates and runners, 78*A*.
PETINIAUD, A., corrosion of copper steel, 58*A*.
PETRI, O., effect of phosphorus in cast iron, 101*A*.
PFANNENSCHMIDT, C. W., cast machine parts, 10*A*.
PHAIR, W. A., wire mill of Wickwire Spencer Steel Co., 138*A*.
PHIFER, J. J., wire drawing, 86*A*.
PHILIPPE, C. D., synthetic bearing materials, 140*A*., 188*A*.
PHILLIPSON, G. C., elected Member, 3*P*.

PHRAGMÉN, G., oxygen/hydrogen/molten-iron system, 338*P*.
PICHAKHCHI, I. D.:
flakes in chromium-molybdenum steel, 283*A*.
internal cracks in forgings, 138*A*.
PICKMAN, D. O., elected Associate, 3*P*.
PIERCE, W. C., spectrum analysis, 313*A*.
PINDER, H. W., cutting materials, 94*A*.
PINSL, H., determination of cobalt in steel, 311*A*.
PIRARD, A., photo-elasticity, 296*A*.
PIWOWARSKY, E.:
effect of ladle additions on cast iron, 258*A*.
high-purity aluminium for deoxidation of steel, 136*A*.
impact and fatigue strength of cast iron, 296*A*.
POHL, M. VON, metallic coatings, 154*A*.
POLOVNIKOV, V. V., heat treatment of chromium magnet steel, 160*A*.
POMP, A.:
deep-drawing tests of alloy steel, 239*A*.
early wrought-iron gun, 264*A*.
fatigue of helical springs, 298*A*.
hardening of chromium-molybdenum and chromium-nickel steel, 97*A*.
rolling flat wire, 87*A*.
PORSCH, H., pitch extraction, 225*A*.
PORTEOUS, J., elected Member, 3*P*.
PORTEVIN, A.:
corrosion of steel by nitrates, 57*A*.
corrosion of welds, 57*A*.
effect of inclusions on corrosion, 55*A*.
oxide films, 59*A*.
preparation of alloys by fusion, 128*A*.
structure of nickel steel, 48*A*.
transformation of austenite, 212*A*.
PÖSCHL, T., micro-fracturing machine, 103*A*.
POURBAIX, M., thermodynamics and corrosion, 54*A*.
POWELL, L. C., heat-treatment plant of Borg-Warner Corp., 194*A*.
POYITT, D. G., electric heat-treatment furnaces, 22*A*.
POYSIKHIS, M. I., annealing of cold-rolled strip, 91*A*.
POYSON, P., spheroidising of steel, 52*A*.
PRELINGER, H., electrolytic descaling, 153*A*.
PREYS, G. A., turning of cast iron, 202*A*.
PRIDANTSEV, M., heat treatment of steel, 194*A*.
PRONENKO, N. I., determination of silica in iron ore, 313*A*.
PROSVIRIN, V. I., nitriding during quenching, 191*A*.
PULEWKA, W., vanadium carbides in steel, 309*A*.

RABBITT, J. A., nickel steel, 161*A*.
RÄDEKER, W., attack of zinc on iron in galvanising, 157*A*.
RADEMACHER, C., copper-coated plates, 247*A*.
RAGATZ, R. A., hardness gradients in tempered cylinders, 40*A*.
RAIT, J. R., viscosity of slags and glasses, 121*A*.
RAPATZ, F., effect of vanadium and chromium in high-speed steel, 100*A*.
RATHMANN, W. G., forge furnaces, 85*A*.
RAUB, E., nickel plating, 247*A*.
RAUSIN, YA., annealing of chromium steel, 192*A*.
READ, H. J., electrolyte films, 31*A*.
REEDER, A. M., cold-heading of wire, 284*A*.
REES, T. D., deep-drawing tests of sheets, 238*A*.
REID, E. A., spark tests, 97*A*.
REID, W., use of steel for heavy machinery parts, 46*A*.
REIMER, G., cold-rolling, 88*A*.
REITMEISTER, W., moulding sand, 130*A*.
REMIN, V. P., segregation in ingots, 84*A*.
RENNERFELT, I., Rennerfelt-Kalling process, 73*A*.
RESCHKA, J., precipitation-hardening of steel, 159*A*.
REYNOLDS, D. A.:
carbonising properties of coal, 68*A*.
coking properties of coal, 4*A*., 174*A*.
RHINES, F. N., effect of structure on diffusion in solid metals, 48*A*.
RHODES, F. H., reactions in arc welding, 148*A*.
RICHARDS, E. T., aluminium coating of wire, 33*A*.

RICHARDSON, H. M.:
action of alkalies on refractory materials, 119*A*.
jointing cements, 119*A*., 120*A*.
RICKETT, R. L., annealing of steel, 23*A*.
RIEDRICH, G., effect of vanadium on grain disintegration in chromium-nickel steel, 211*A*.
RILEY, H. L., crystallite growth during carbonisation, 174*A*.
RIMARSKI, W., occurrence of nitrogen oxides and carbon monoxide in welding, 292*A*.
ROBBINS, F. J.:
leaded steel, 94*A*.
strain annealing, 192*A*.
ROBERTS, A. L., elasticity of chrome and chrome-magnesite refractories, 122*A*.
ROBERTS, J., coking tests of coal, 224*A*.
ROBERTSON, J. M., austempering, 195*A*.
ROBIETTE, A. G., gas-fired heat-treatment furnaces, 90*A*.
ROCCA, A., asbestos-cement coatings for tubes, 35*A*.
ROCKEFELLER, H. E.:
flame gouging, 27*A*.
preparation of plate edges for welding, 292*A*.
RODGERS, J. W., quench ageing, strain ageing and cold working, 238*A*.
ROESCH, K., chromium-steel castings, 161*A*.
ROESER, W., use of oxygen-enriched blast in basic converters, 79*A*.
ROGERS, B. A., magnetic behaviour of slags, 206*A*.
ROLL, F.:
determination of carbon and silicon in cast iron, 214*A*.
properties of welds, 245*A*.
ROMASCHENKO, V. A., determination of silica in iron ore, 313*A*.
ROMINSKI, E. A., impact values of welded joints, 27*A*.
RONCERAY, P., rusting of iron by drops of water, 59*A*.
ROOKSBY, H. P., X-ray examination of metals, 261*A*.
ROONEY, T. E., estimation of hydrogen in steel, 257*P*.
ROŠ, M., X-ray examination of welded joints, 152*A*.
ROSE, A.:
effect of cooling rate on vanadium steel, 212*A*.
hardening of steel, 243*A*.
ROSENBERG, E. M., wear of cast iron, 253*A*.
ROSIN, P. O., heat transfer in gas flow, 320*P*.
ROSS, E. F., rolling mills of Youngstown Sheet and Tube Co., 88*A*.
ROSS, W. F.:
annealing furnaces for malleable castings, 9*A*.
heat treatment of propeller shafts, 21*A*.
ROTH, E. L., foundry costing, 277*A*.
ROWDEN, E., effect of coal gas on refractories, 118*A*.
ROWE, C. A., hardness gradients in tempered cylinders, 40*A*.
ROZDYMAKHO, P. S., gas evolution in steel melting, 280*A*.
RUDYY, I., stresses in rolling-mill couples and spindles, 158*A*.
RUSHER, M. A., thickness determination of non-magnetic coatings, 155*A*.
RUSSELL, C. C., swelling of coal, 4*A*.
RUSSELL, G. A. V., pig iron manufacture in America, 453*P*.
RUSSELL, P. A., alloy cast iron, 129*A*.
RUSSELL, T. F.:
damping capacity of steel, 203*P*.
heat transfer in gas flow, 318*P*.
RYAN, M. A., passivity of chromium, 267*A*.

SACCHI, V. P., porosity of metallic coatings, 156*A*.
SACHS, G.:
flow of metals, 295*A*.
internal stresses in piston rods, 38*A*.
recrystallisation of iron-nickel alloys, 307*A*.
SALTYKOV, S. A., graphitisation nodules in malleable cast iron, 164*A*., 262*A*.
SAMARIN, A. M., determination of nitrogen in iron-chromium alloys, 312*A*.
SAMARIN, S., electron defectoscope, 260*A*.
SANDBERG, S. P. A. F., elected Member, 3*P*.
SANDERSON, L.:
drill steels, 22*A*.
stainless steel, 256*A*.
SANDS, J. W., effect of nickel in cutting tools, 100*A*.
SANFORD, R. L., magnetic tests, 98*A*.
SAPIRO, S., heating of open-hearth furnaces, 79*A*.

SAPOZHNIKOV, L. M.:
carbonising of coal, 5*A*.
properties of coke, 225*A*.
SARKISYANTS, A., composition of blast-furnace gas, 274*A*.
SAUL, K. H., measurement of stress, 210*A*.
SAUNDERS, O. A., and H. FORD:
Paper: "Heat Transfer in the Flow of Gas Through a Bed of Solid Particles," 291*P*. *Discussion*, 317*P*. Authors' Reply, 325*P*.
SAVOS'KIN, M., valves for open-hearth furnaces, 134*A*.
SAWARAGI, Y., internal friction in fatigue tests, 205*A*.
SAYRE, M. F., stresses in welds, 200*A*.
SCARPA, O., protection of tubes against electric currents, 58*A*.
SCHACK, A.:
heat transfer, 68*A*.
radiation of furnace gases, 124*A*.
SCHÄFER, R., solidification of ingots, 83*A*, 185*A*.
SCHAFMEISTER, P., iron-chromium-manganese diagram, 52*A*.
SCHALLER, W., reduction of oxides, 126*A*.
SCHEEBER, K., low-temperature carbonisation tests, 224*A*.
SCHEID, A. J., jun., hardenability of tool steel, 41*A*.
SCHEINOST, R., effect of case-hardening on bend and torsional fatigue strength, 40*A*.
SCHERER, R.:
effect of vanadium and chromium in high-speed steel, 100*A*.
forged rolls, 86*A*., 237*A*.
intercrystalline corrosion of chromium-nickel steel, 55*A*.
SCHEURING, W., welding machines, 92*A*.
SCHLECHT, L., nickel-carbonyl powder, 278*A*.
SCHLECHTWEG, H.:
effect of lattice deformation on magnetic properties, 99*A*.
effect of stresses on magnetic properties, 98*A*.
magnetic properties of Permalloy, 299*A*.
polymorphism of iron, 264*A*.
SCHLENKER, P. W., Brown-Boveri arc furnaces, 136*A*.
SCHLIESSMANN, O., determination of niobium and tantalum by spectrum analysis, 110*A*.
SCHLÖTTER, M., electrodeposition of tin and lead, 35*A*.
SCHNADT, H., Huey corrosion test, 56*A*.
SCHNEDLER, H., welded automobile frames, 93*A*.
SCHNEIDER, E., elected Honorary Member, 6*P*.
SCHNEIDER, R. P., effect of graphite additions on cast iron, 9*A*.
SCHÖNROCK, K., bend tests of welds, 244*A*.
SCHOON, T., ferro-magnetism, 99*A*.
SCHRADER, H.:
effect of elements on scaling and decarburisation of steel, 20*A*.
magnetic powder tests, 261*A*.
manganese case-hardening steel, 256*A*.
SCHUBERT, W., increased efficiency of ironworks, 179*A*.
SCHULTE, F., chromium and chromium-nickel cast steels, 101*A*.
SCHULZ, E. H., effect of rest periods on fatigue strength, 251*A*.
SCHULZE, G. E. R., Laves phases, 165*A*.
SCHURECHT, H. G., action of slag on refractories, 66*A*.
SCHWALBE, R., sintered iron, 128*A*.
SCHWARZ, H. A., effect of elements on graphitisation of cast iron, 44*A*.
SCHWIEDESSEN, H., combustion of gases, 223*A*.
SCOTT, F. W., sulphur control in basic open-hearth process, 135*A*.
SCOTT, H.:
hardness conversion chart, 41*A*.
quenching media, 23*A*.
SCOTT-KING, A., elected Member, 3*P*.
SEE, W. G., submerged heating of pickling baths, 153*A*.
SÉFÉRIAN, D.:
oxy-acetylene cutting, 201*A*.
weldability tests, 151*A*.
SEFING, F. G., flame-hardening of cast iron, 89*A*.
SEGELKEN, L., long-distance gas supply in Silesia, 69*A*.
SÉGUENOT, M., corrosion of steel, 53*A*.
SELETSKY, L., surface conditions on precision machines, 94*A*.
SELIVANOV, N., open-hearth practice at Magnitogorsk, 183*A*.
SELTZ, H., heat capacity of iron carbide, 207*A*.
SELVIG, W. A., coking properties of coal, 4*A*., 68*A*., 174*A*.

SEVERDENKO, V. P., effect of rolling conditions on properties of metals, 286*A*.
SHEPHERD, H. H., cupola practice, 129*A*.
SHEPHERD, R. C., oil-engine castings, 180*A*.
SHNEEROV, YA., slagging practice in open-hearth furnaces, 80*A*.
SHUFFSTALL, J. A., moulding of gears, 230*A*.
SHULTE, YU., melting of chromium-steel scrap, 281*A*.
SHUMAR, J. F., effect of elements on graphitisation of cast iron, 44*A*.
SICLEN, H. E. VAN, adherence of paint coatings, 249*A*.
SIEBEL, E., brittleness of steel at high temperatures, 300*A*.
SIEBERT, C. A.:
effect of carbon on oxidation of steel, 21*A*.
effect of humidity of air on oxidation of steel, 59*A*.
SIEGEL, H., electric furnace practice, 81*A*.
SIEGER, M. P., rolling-mill plants of Carnegie-Illinois Steel Corp. and American Rolling Mill Co., 141*A*.
SIEVEKING, H. A., manufacture of steel in electric furnaces, 184*A*.
SIMON, A. C., silver plating, 33*A*.
SIMON, G.:
electric annealing furnaces, 146*A*.
production of protective atmospheres, 146*A*.
SIMON, R. W., grain size in steel, 165*A*.
SIMON, W. H., arc welding electrodes, 148*A*.
SINGH, S., elected Associate, 3*P*.
SKELTON, L. G. V., elected Associate, 3*P*.
SKINNER, H. E., corrosion of ships, 59*A*.
SLOMAN, H. A., estimation of hydrogen in steel, 255*P*.
SMIRNOV, V., electron defectoscope, 260*A*.
SMITH, A. J., welded structures in steel, 200*A*.
SMITH, A. J. N.:
high-duty cast iron, 180*A*.
treatment of cast iron in ladle, 9*A*.
SMITH, A. W., heat transmission, 3*A*.
SMITH, C. S., measurement of specific and latent heats, 42*A*.
SMITH, E. K., chromium steel castings, 256*A*.
SMITH, F. E., elected Member, 3*P*.
SMITH, G. V., properties of isothermal decomposition products of austenite, 48*A*.
SMITH, H. E., damping capacity of steel, 208*P*.
SMITH, J. O., torsional fatigue strength, 158*A*.
SMITH, S., flame-hardening, 145*A*.
SMITH, S. L., damping capacity of steel, 202*P*.
SNELLING, R. J., aluminium coating of wire, 33*A*.
SNODGRASS, C. B., elected Associate, 3*P*.
SNOEK, J. L., iron-aluminium-nickel system, 106*A*.
SOBOL', G. P., grain size determination in steel, 263*A*.
SOLOV'EV, L., steel sheets, 162*A*.
SOROKIN, V., blast-furnace charging bells, 177*A*.
SPAULDING, R. L., flame-hardening, 19*A*.
SPERANSKIY, V., production of acid-resistant steel, 135*A*.
SPETZLER, E., effect of gases on dissociation of carbon monoxide, 71*A*.
SPIES, F., early wrought iron gun, 264*A*.
SPIVAK, V. P., magnetic sorting of steel, 300*A*.
SPOONER, C. E.:
swelling of coal, 174*A*.
tar yield from producer coals, 125*A*.
SPRAGEN, W.:
effect of carbon on welding of steel, 26*A*.
effect of elements in welding, 294*A*.
welding of copper steel, 26*A*.
welding of tungsten steel, 199*A*.
SPRETNAK, J., recrystallisation of iron-nickel alloys, 307*A*.
SPRINGER, R., brightness of metals, 247*A*.
SPRUNK, G. C.:
coking properties of coal, 4*A*., 174*A*.
hydrogenation of coal, 69*A*, 226*A*.
SPUHR, W. P., determination of molybdenum, 311*A*.
STÄBLEIN, F., stress measurement by X-rays, 296*A*., 297*A*.
STACKELBERG, M. VON, polarographic analysis of alloy steel, 214*A*.
STADLER, F., vanadium in cast iron and cast steel, 303*A*.
STAMM, K. O., magnetic behaviour of slags, 206*A*.

STARK, B. V., oxygen-content of open-hearth heats, 134*A*.
STENGEL, E., determination of phosphorus in vanadium slags, 111*A*.
STEPHENSON, E., jun., air recirculation in furnaces, 190*A*.
STEPIN, V. V.:
determination of iron in ferro-vanadium, 311*A*.
determination of molybdenum and phosphorus, 312*A*.
STERLING, C., determination of molybdenum, 311*A*.
STEUDEL, G. E., blast-furnace practice, 7*A*.
STEVENS, H.:
production of liquid fuel, 69*A*.
roll turning, 87*A*.
STICHA, E. A., creep tests, 43*A*.
STIELER, C., welding rods, 92*A*.
STOGNIY, N. I., determination of oxide in sponge iron, 215*A*.
STOLTZ, G. E., Ignitron rectifiers, 142*A*.
STONE, R. L., thermochemistry of olivine in forsterite, 1*A*.
STORCH, H. H., hydrogenation of coal, 69*A*., 226*A*.
STOUGHTON, B., electrometallurgy, 193*A*.
STOUT, R. D., torsion-impact test, 37*A*.
STRAUSSER, P. W. C., porosity tests of electrodeposited coatings, 31*A*.
SUTTON, H., burning during welding of sheets, 25*A*., 150*A*.
SVANTESSON, S., cracks in welds, 292*A*.
SVEDE-SHVETS, N. I., pressures and spreading in hot-rolling of steel, 140*A*.
SWANSON, A. N., prevention of shatter cracks, 39*A*.
SWARUP, D., heat treatment of stainless steel, 289*A*.
SWIFT, H. W., drawing tests of sheets, 237*A*.
SWINDEN, T.:
anti-piping compounds, 278*P*.
burning during welding of sheets, 25*A*., 150*A*.
estimation of hydrogen in steel, 254*P*.
remarks on Bradley, Bragg and Sykes's paper, 152*P*.
research work at Cambridge, 238*P*.
SWINNERTON, N. W., welding of railway trackwork, 26*A*.
SY, A. I. DE, corrosion of chromium-manganese steel, 108*A*., 167*A*.
SYKES, C.:
Paper: "Researches into the Structure of Alloys." See BRADLEY, A. J.
elected Member, 3*P*.
SYKES, W. P., precipitation hardening, 41*A*.
SYSKOV, K. I., properties of coke, 225*A*.
SZALANCZY, C. L., metal stamping tools, 187*A*.

TAGA, Y., internal friction in fatigue tests, 205*A*.
TAGEEV, V. M., solidification of ingots, 235*A*.
TANN, J. P., elected Member, 3*P*.
TAPSELL, H. J., creep of metals, 253*A*., 301*A*.
TARNOVSKIY, A. V., hardness tests on chromium steel wire, 205*A*.
TATNALL, R. R., wire drawing, 139*A*.
TAYLOR, A., crystallite growth during carbonisation, 174*A*.
TAYLOR, F., corrosion by town gas, 166*A*.
TENENBAUM, M., reduction of iron ore by carbon monoxide, 178*A*.
TERRETT, L. E., thickness determination of metallic coatings, 30*A*.
THANHEISER, G., spectrum analysis, 313*A*.
THEIS, A., welding of boiler plates, 292*A*.
THEWS, E. R., optical pyrometers, 143*A*.
THOMAS, B., effect of manganese in steel, 258*A*.
THOMAS, R. D., jun., reactions in arc welding, 148*A*.
THOMPSON, F. C.:
Paper: "The Damping Capacity of Steel and its Measurement." *See* CONTRACTOR, G. P.
THOMPSON, J. G.:
preparation of high-purity iron, 7*A*.
slip-casting of crucibles, 1*A*.
THOMPSON, M. R., measurement of *p*H in plating baths, 29*A*.
THOMPSON, R. W., drop-forging of stainless alloys, 14*A*.
THOMPSON, W. B., corrosion-resistant steel, 162*A*.
THUM, A.:
effect of phosphorus in cast iron, 101*A*.

THUM (*contd.*)—
fatigue of fillet welds, 200*A*.
measurement of stress, 210*A*.
torsional fatigue strength of fillet welds, 93*A*.
TIEMERSMA-WICHERS, C. M., corrosion of pipes in soil, 266*A*.
TIFFIN, W. T., cutting tests with butane, propane and acetylene, 245*A*.
TIKHOMIROV, N. V., internal cracks in forgings, 138*A*.
TIPPER, A., synthetic moulding sand, 230*A*.
TISDALE, N. F., elected Member, 3*P*.
TKACHENKO, N. S., determination of silica in iron ore, 313*A*.
TKACHEV, A. S., gas evolution in steel melting, 280*A*.
TOBEY, R. G., radiography, 305*A*.
TODD, W. J., pyrometry, 288*A*.
TÖDT, F.:
corrosion of iron, 56*A*.
standardisation of corrosion tests, 53*A*.
TOFOROV, S. A., effect of nature of coke on oxidising zone in blast-furnace, 70*A*.
TOMITA, G., nickel alloys for gas industry, 161*A*.
TOMLINSON, J. R., ironstone mining in Cleveland, 64*A*.
TÖPKER, H., iron/iron-silicide/tungsten diagram, 106*A*.
TORRES, O. R., spectrum analysis, 313*A*.
TOTTLE, L. G., elected Associate, 3*P*.
TRANTER, G. D., open-hearth furnaces, 233*A*.
TRAUTSCHOLD, R., metering system for ironworks, 178*A*.
TRAVERS, H. A., safety devices for mill motors, 142*A*.
TREKALO, S. K., effect of coke properties on blast-furnace process, 227*A*.
TREMBOUR, F. W., quenching media, 23*A*.
TRINKS, W., slab-heating furnaces, 186*A*.
TRINTER, M. J., effect of elements on graphitisation of cast iron, 44*A*.
TROIANO, A. R., austenite-martensite transformation in steel, 50*A*.
TROUGHTON, E. R., elected Member, 3*P*.
TSCHERNOFF, D., life and work, 210*A*.
TSELIKOV, A. I., pressure distribution in rolling mills, 87*A*.
TURNER, T. H.:
painting of steel, 239*P*.
skin friction in gas flow, 320*P*.
TYRIE, T., cast iron for engineering purposes, 276*A*.

UEBEL, F., Rudeloff-Gallick equation for conversion of elongation, 95*A*.
UEDA, H., elected Member, 3*P*.
UHLIG, H. H., passivity of stainless steels, 108*A*.
UL'MAN, N., deformation-resistance of structural steel, 138*A*.
UMRIKHIN, P. V., effect of mould design on quality of bottom-poured ingots, 83*A*.
URQUHART, J. E., blast-furnace practice, 6*A*.

VAILLANT, R., welding of stainless steel, 25*A*.
VALEA, I., effect of sulphur dioxide on iron, 166*A*.
VALENSI, G., oxidation of metals, 21*A*.
VANDEVATE, D., hardening of gear teeth, 19*A*.
VAUGHAN, J. C., jun., solubility of nitrogen in iron-silicon alloys, 99*A*.
VERDINNE, H., coal-washing, 124*A*.
VERNON, W. H. J., oxide films on metals, 266*A*.
VESELKOV, N., design of open-hearth furnaces, 133*A*.
VILA, A., protective coatings, 36*A*.
VINOGRAD, M. I.:
determination of inclusions in steel, 263*A*.
measurement of depth of carburisation, 305*A*.
VIROZUB, E. V., flame temperature in coke ovens, 224*A*.
VOGEL, R.:
iron/iron-silicide/tungsten diagram, 106*A*.
iron-silicon-vanadium diagram, 309*A*.
VOLOVIK, G. A., effect of coke properties on blast-furnace process, 227*A*.
VORONOV, G. D., determination of nickel, 312*A*.
VOSS, H., chromium-molybdenum structural steel, 161*A*.

VRATSKIY, M., stresses in rolling-mill couples and spindles, 158*A*.
VYAZNIKOV, N. F., annealing of cold-rolled strip, 91*A*.
VYSE, J., action of slags on refractories, 120*A*.

WAGENER, A., recovery of iron from slag, 72*A*.
WAGNER, J., intercrystalline corrosion of stainless steel, 55*A*.
WAINWRIGHT, H. A.:
quench ageing, strain ageing and cold working, 238*A*.
elected Member, 3*P*.
WALCOTT, W. D., properties of weld metal, 294*A*.
WALKER, A. R., jig for resistance welding of tubes, 198*A*.
WALLACE, W. P., annealing of steel, 23*A*.
WAMPLER, C. P., fatigue tests of wire, 96*A*.
WARD, N. F.:
creep tests of welded steel, 301*A*.
grain size in steel, 48*A*.
WARREN, E. T., blast-furnace practice, 455*P*.
WATERHOUSE, G. B., alloy steels, 82*A*.
WATKINS, S. P., manufacture of stainless steel wire, 139*A*.
WATSON, H. H., top-charge electric furnaces, 235*A*.
WAYMAN, M., moulding of ship's propeller, 131*A*.
WEG, E., iron ore in Germany, 221*A*.
WEICHSELMANN, F., operation of steelworks, 282*A*.
WEISE, C. P., inhibitors in pickling, 153*A*.
WEISS, L., loading of rolling-mill bearings, 240*A*.
WEITZER, H., oxidation losses in coreless induction furnaces, 184*A*.
WELLAUER, E. J., gears, 204*A*.
WELLINGER, K., brittleness of steel at high temperatures, 300*A*.
WELLS, C.
effect of structure on diffusion in solid metals, 48*A*.
heat capacity of iron carbide, 207*A*.
WELTER, G., effect of resiliency of test machine and loading speed on yield point of steel, 37*A*.
WERNER, E., nickel plating, 156*A*.
WERNER, O., fissures in welds, 201*A*.
WERNER, W., alkali-resistance of steel, 107*A*.
WESEMANN, F., smelting of low-grade ore, 71*A*.
WESTBERG, S., elected Member, 3*P*.
WEVER, F.:
effect of cooling rate on vanadium steel, 212*A*.
transformations in manganese steel, 264*A*.
WHETTON, J. T., magnetic survey of hematite ore, 221*A*.
WHITAKER, J. K., elected Associate, 3*P*.
WHITE, A. E.:
effect of molybdenum and vanadium in chromium steel, 46*A*.
properties of steel at high temperatures, 99*A*.
WHITE, J., open-hearth slags, 12*A*.
WHITELEY, J. H.:
effect of inclusions on hydrogen estimation, 255*P*.
segregation in steel, 273*P*.
WHITTEN, J. L., annealing of wire, 284*A*.
WHITTINGHAM, H. H., carburising in salt baths, 89*A*.
WHYTE, R. B., wire rope, 16*A*.
WICKWIRE, C. F., annealing of wire, 284*A*.
WIEGAND, H., effect of case-hardening on bend and torsional fatigue strength, 40*A*.
WIESTER, H. J., bend tests of welds, 244*A*.
WILCOX, R. J., castability of alloy steel, 181*A*.
WILHELM, H., precipitation hardening of steel, 159*A*.
WILKINSON, T. B., welding and cutting of low-alloy structural steel, 92*A*.
WILLEMS, F., effect of hydrogen in steel, 255*A*.
WILLEY, J. M., tests of welds, 152*A*.
WILLIAMS, C. G., elected Member, 3*P*.
WILLIAMS, G. T.:
case-hardening, 241*A*.
hardenability variations in alloy steel, 40*A*.
WILLIAMS, S. R., hardness testing machines, 299*A*.
WILLS, W. H., forging of high-speed steel, 15*A*.
WILSON, W. T., awarded Williams Prize, 7*P*.
WIMMER, P., welding of chromium-molybdenum steel tubes, 199*A*.

WIRTZ, H., determination of tantalum and niobium, 111*A*.
WISHART, H. B., prevention of shatter cracks, 39*A*.
WISSER, J., vanadium in cast iron, 303*A*.
WITTUM, M., nickel plating, 247*A*.
WOGIN, R., elected Associate, 3*P*.
WOOD, C. E., desulphurisation of pig iron, 183*A*.
WOOD, J. W., corrosion by town gas, 166*A*.
WORK, H. K.:
determination of carbon in steel bath, 214*A*.
sensitivity of steel to cold work, 47*A*.
WORMWELL, F., corrosion tests in salt solutions, 58*A*.
WRIGHT, L. F., blast-furnace process, 71*A*.
WULFF, J., transformations in chromium-nickel steel, 105*A*.
WUNSCH, W., long-distance gas supply, 176*A*.
WYANT, R. A., spot welding of steel, 149*A*.
WYGARD, E. J., elected Member, 3*P*.
WYLLIE, M. R. J., elected Member, 3*P*.

YANCEY, H. F., properties of coke, 175*A*.
YENSEN, T. D., magnetic properties of iron and iron-nickel alloys, 42*A*.
YONEMASU, K., elected Member, 3*P*.
YOUNG, H. J., cast iron manufacture, 275*A*.
YUR'EV, S. F., nitriding of crankshafts, 192*A*.

ZAGORODSKIKH, D. M., quenching after deformation, 195*A*.
ZAMBOKY, T. A., rolling of blooms and slabs, 188*A*.
ZAMORUEV, V. M., addition of titanium-ore concentrate to steel, 137*A*.
ZANE, R. E., properties of coke, 175*A*.
ZAROSHCHINSKIY, M., capacity of blooming mills, 88*A*.
ZETTLER, E., relative merits of zinc and cadmium coatings, 34*A*.
ZEYEN, K. L.:
welding of boiler plates, 292*A*.
welding of castings, 199*A*.
ZHAK, A., refractories for casting pits, 123*A*.
ZHIGADLO, A. V., detection of defects, 210*A*.
ZIMMERMAN, J. H., flame-hardening, 289*A*.
ZOLOTAREV, A. A., ageing of deformed material, 98*A*.
ZORN, E., flame-hardening, 190*A*.
ZOTOVA, E., composite steel for guillotine knives, 131*A*.
ZUEV, M., arc furnaces with inclined walls, 136*A*.
ZUITHOFF, A. J., specific heat of iron-nickel alloy, 300*A*.
ZWEILING, E., releasing cupola bottoms, 275*A*.